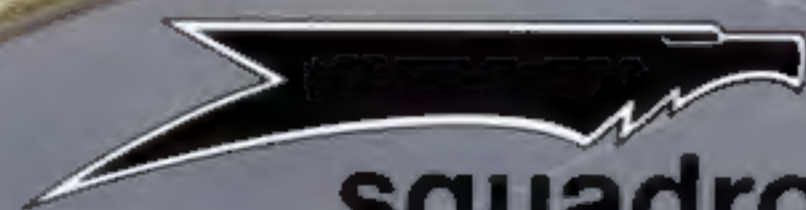


Junkers Ju 88

in action
Part 2



Aircraft Number 113
squadron/signal publications

SPECIAL
8 EXTRA PAGES

Junkers Ju 88

By Brian Filley

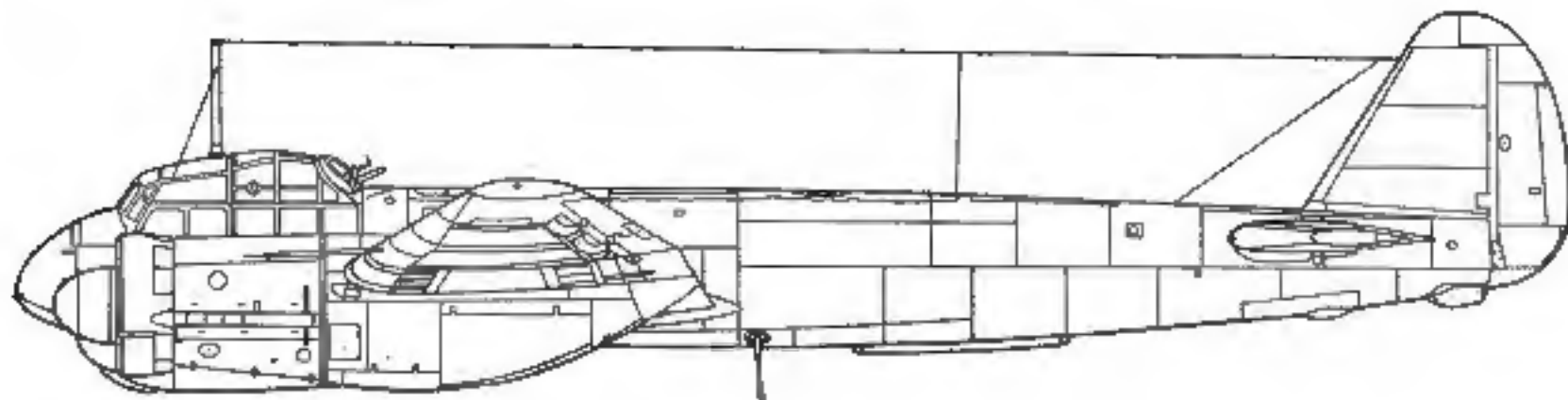
Color by Don Greer

Illustrated by Perry Manley

And Joe Sewell

in action

Part 2



Aircraft Number 113
squadron/signal publications



A Ju 88C-6 Tag Zerstörer (Day Destroyer) of 4. Staffel/KG 76 is engaged by Soviet fighters over the Eastern Front during 1942. F1+XM has a temporary White winter camouflage sprayed over its upper surfaces and fake "bomber windows" have been painted on the nose to lure enemy fighters into head-on attacks.

Special Recognition:

A special thank you must go to Wolfgang Tamme, Hans-Joachim Mau, Mr. S.M. Coates, George Punka and the Keeper of the Photographs, Imperial War Museum, for their gracious and informative correspondence. Also to Larry Hammonds, Jerry Rizk, Mark Hunter, Jim Mesko and Carl King for all those little favors that went a long way towards finishing this book! A most hearty thanks goes to Manfred Griehl, whose supply of photos and data certainly speeded the completion of this book. And finally, I offer best wishes to Hans-Heiri Stapfer, who has provided a continual stream of photos and information, even though I seldom have anything to trade in return...perhaps a keg of beer, Hans-Heiri?

COPYRIGHT © 1991 SQUADRON/SIGNAL PUBLICATIONS, INC.

1115 CROWLEY DRIVE CARROLLTON, TEXAS 75011-5010

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form by any means electrical, mechanical or otherwise, without written permission of the publisher.

ISBN 0-89747-258-6

If you have any photographs of the aircraft, armor, soldiers or ships of any nation, particularly wartime snapshots, why not share them with us and help make Squadron/Signal's books all the more interesting and complete in the future. Any photograph sent to us will be copied and the original returned. The donor will be fully credited for any photos used. Please send them to:

Squadron/Signal Publications, Inc.
1115 Crowley Drive.
Carrollton, TX 75011-5010.

Photo Credits:

Bundesarchiv
S.M. Coates
Hermann P. Dörner
E.C.P.A.
Manfred Griehl
Imperial War Museum
R.M. Meixner
Jim Mesko
National Archives
Hans Obert

George Punka
Hans Redemann
Gene Stafford
Hans-Heiri Stapfer
Squadron/Signal
Wolfgang Tamme
M. Terlinden
Zdenek Titz
U.S. Air Force

Author's Note:

Research into the Ju 88 fighter variants has uncovered a great many "gray areas" and conflicting data concerning the aircraft's development. As a result, this book covers the major Ju 88 fighter variants and provides additional information on some of the more questionable areas. This information was added to provide the reader with a comprehensive overview of the Ju 88's complicated (and sometimes baffling) evolution.

This Ju 88C-6 was assigned to V/KG 40 during late 1942 and was used for long range fighter patrols and anti-shipping duties from coastal bases in France. This early production Ju 88C-6 was coded either F8+EX or F8+EZ. (Bundesarchiv)



Introduction

When Adolf Hitler's Reichsluftfahrtministerium (State Aviation Ministry - RLM) issued a specification for a Schnellbomber (fast bomber) to Germany's aviation industry during 1935, it simultaneously created Germany's most important wartime bomber, as well as one of its most popular heavy fighters.

The Junkers Ju 88, designed by the Junkers Flugzeug und Motorenwerke A.G. of Dessau, Germany, not only surpassed the RLM's expectations as a multi-purpose medium bomber, but ultimately excelled as a *Tag Zerstörer* (day destroyer) and *Schwerer Nachtjäger* (heavy night-fighter), a role which the Third Reich would later desperately need. By the end of the war, approximately 3,964 Ju 88 fighters had been manufactured out of a total of 15,000 machines, or just over twenty-five percent of the total Ju 88 production run.

When the prototype Ju 88V-1 first flew on 21 December 1936, there was no thought of using the aircraft as a fighter. It soon became obvious, however, that the Ju 88 possessed excellent handling qualities, high speed and long range — all of which could be advantageous in the *Zerstörer* role. Despite this, primary prototype development remained solidly focused on the evolution of the first production bomber variant, the Ju 88 A-1.

When the Ju 88A-1 entered production during the Spring of 1939, the favored *Tag Zerstörer* in use with the Luftwaffe was the smaller, twin-tailed, twin-engined Messerschmitt Bf 110. Despite the fact that the Bf 110 held a great deal of promise and was personally favored by Reichsmarschall Hermann Goring, it lacked range and was later found to be outclassed by British single engined fighters. As an alternative, Junkers designers proposed that the long range Ju 88 be armed with a fixed battery of forward firing guns in the nose as a supplement to the Bf 110s. The RLM, adhering to the bomber only concept of the Ju 88, subsequently granted permission for construction of Ju 88 *Zerstörer* prototypes (originally referred to as the Ju 88Z) on a strict low-priority basis.

The first airframe believed to be reserved for conversion was the Ju 88V-7 bomber prototype (GU+AE). The Ju 88 fighter modification consisted of three fixed 7.92MM MG 17 machine guns and one MG-FF 20MM cannon, all mounted to protrude through the starboard nose glass. The underwing ETC bomb racks were eliminated and the forward ventral gondola was faired over with a tapered fairing. This arrangement reduced the maximum weight of the bomber airframe and increased the aircraft's top speed to 295 mph, some 15 mph faster than the Ju 88A-1.

Two further prototype fighter conversions flew during early 1940, the Ju 88Z-15 (ex-Ju 88V-15) and the Ju 88Z-19 (ex-Ju 88V-19). Both aircraft featured sheet metal nosecones with gun ports for the forward firing weapons and a hollow "shroud" over the forward ventral gondola. This fairing contained the spent casing ejector chutes for the nose guns. Another feature that was later standardized was the addition of three gun gas exhaust ports on the starboard side of the fuselage nose. These ports were used to vent the gun gases from the three MG 17s. Later, the Ju 88Z-19 prototype was modified with two different style bulbous extensions of the ventral gondola. These housed a forward-firing MG 151 15MM or 20MM cannon, on an experimental basis. The Ju 88Z-15 and Ju 88Z-19 are believed to be the true "pattern" aircraft of the production Ju 88 fighters.



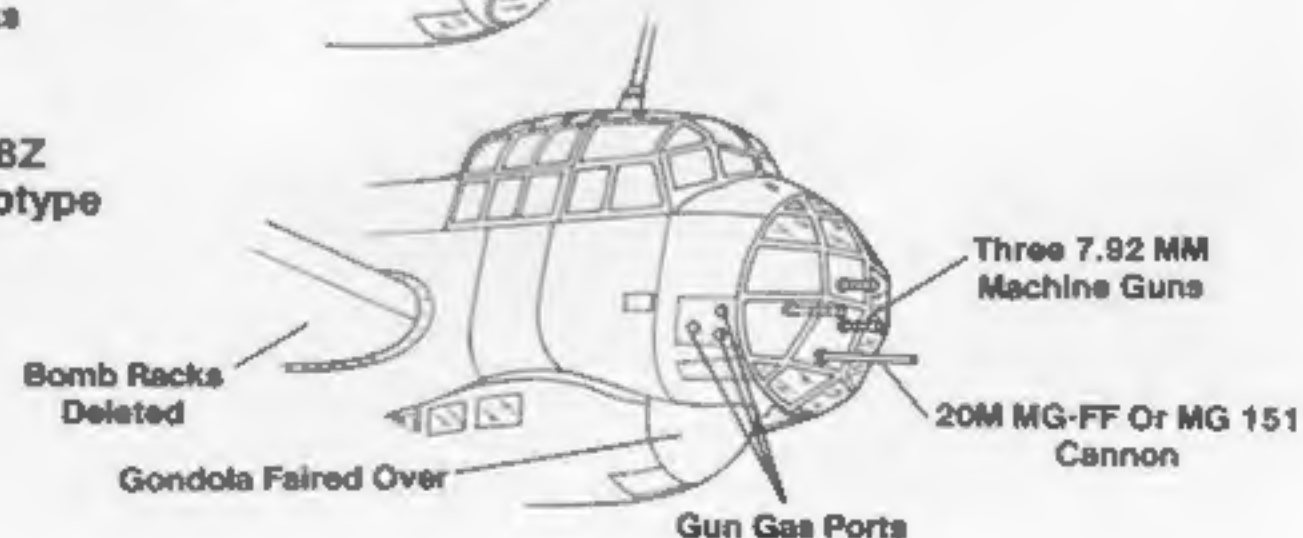
The first Ju 88Z (for *Zerstörer*) test beds were conversions of Ju 88 bomber airframes armed with three 7.92mm machine guns and a 20mm MG-FF cannon. This aircraft is believed to be the Ju 88V-7 ex-bomber prototype, although other sources disagree.

Armament Development

Ju 88A-1



Ju 88Z Prototype



Internally, the gun breeches for the nose mounted weapons extended back into the lower starboard cockpit with the ammunition bins for the three belt-fed MG 17s being located at the pilot's feet. The 20MM MG-FF cannon was drum-fed and could be manually reloaded in flight, while the alternate long-barreled 20MM MG 151 cannon was belt-fed from an ammunition locker located on the starboard cockpit wall.

Like the Ju 88A-1 bomber, the *Zerstörer* version retained the flexible 7.92MM drum-fed MG 15 machine guns in the starboard windshield, the rear ventral position and upper rear position. The windshield mounted gun was usually locked in a forward firing position by an exterior retractable barrel clamp. All forward gun sighting was accomplished with a *Revi* reflector gun sight mounted on the pilot's side of the instrument panel. The instrument panel itself was initially unchanged from that of the Ju 88A-1 bomber; however, later aircraft had the main compass relocated to the pilot's side of the cockpit since the starboard instrument panel was enlarged to accommodate additional instrumentation.

Satisfied with the progress of the Ju 88Z prototypes, the RLM authorized the limited production of Ju 88 *Zerstörers* during early 1940 under the designation Ju 88C. Although some of the Ju 88C versions initially proposed by Junkers were to have utilized the new BMW 801 air-cooled radial engine, the RLM negated these proposals by assigning the BMW engines to higher priority programs like the Focke-Wulf Fw 190 fighter and Dornier Do 217 bomber. As a result, the first production Ju 88Cs were direct conversions of existing bomber airframes using Junkers Jumo 211 liquid cooled in-line engines.

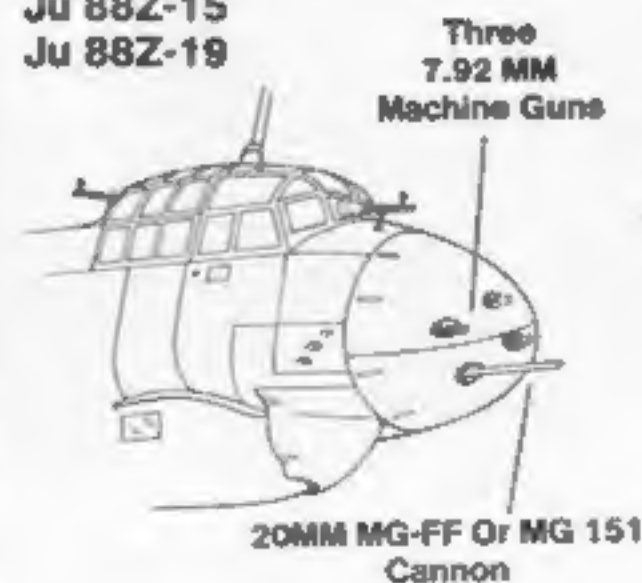
(Right) The Ju 88Z-15 and Z-19 were also converted from bomber airframes and these aircraft served as pattern aircraft for production Ju 88C fighters. The four nose weapons and gondola shell casing ejection shroud are visible. The Ju 88Z-19 was later used to test a cannon mounting in the gondola.

(Below) Identifiable by the number on its forward fuselage, the Ju 88V-7 (GU+AE) was later converted into a liaison aircraft. The sheet metal noscap was the same style as those fitted to production Ju 88C fighters. The lower fuselage nose windows have been retained.

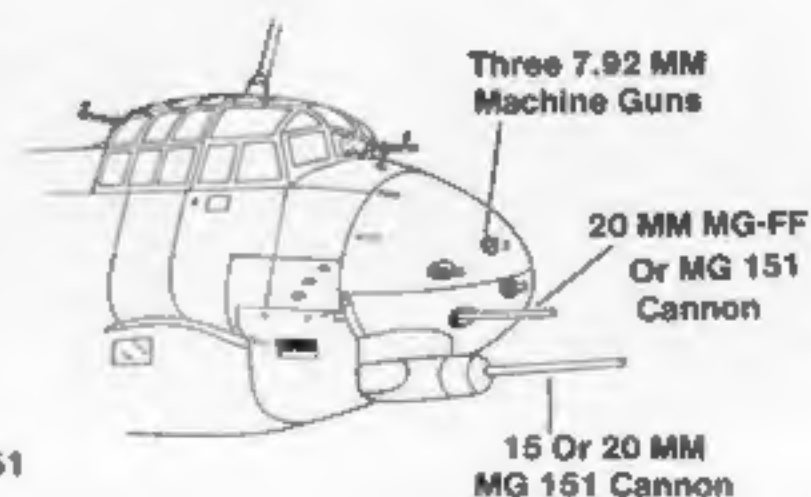


Armament

Ju 88Z-15
Ju 88Z-19



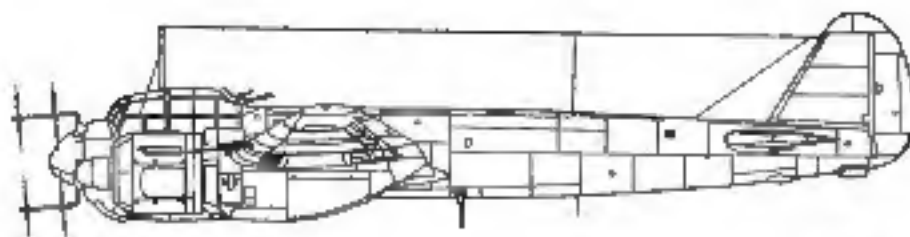
Ju 88Z-19 (Modified)



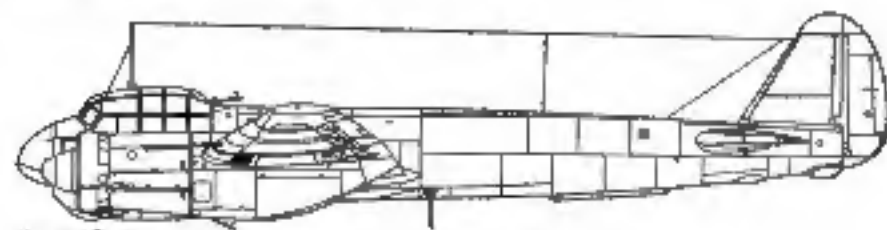
Development



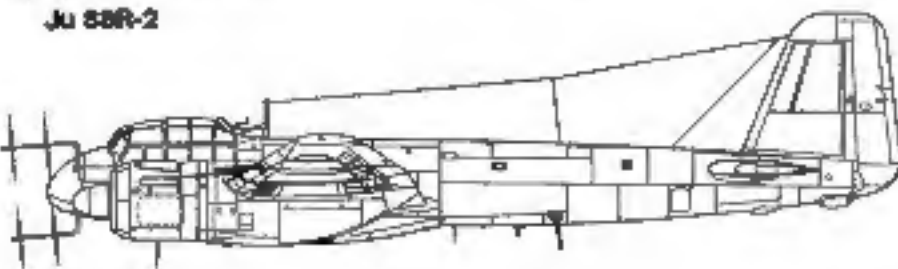
Ju 88C-2



Ju 88R-2



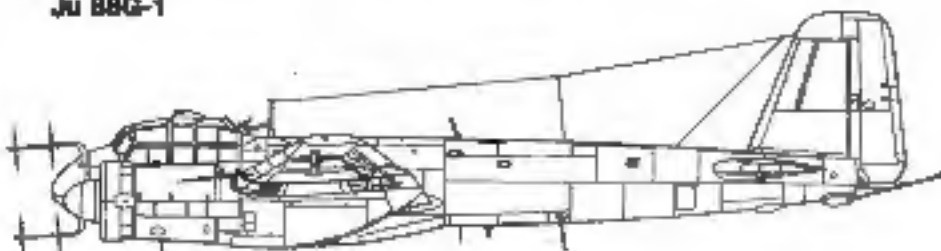
Ju 88C-4



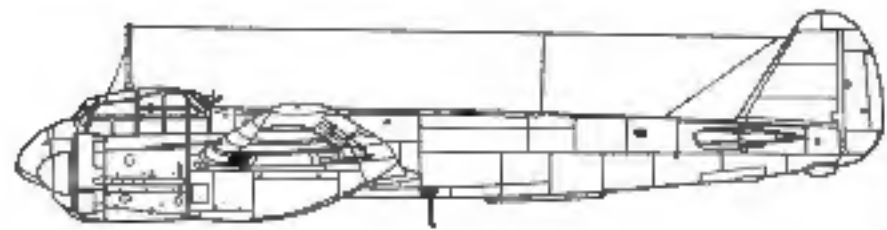
Ju 88G-1



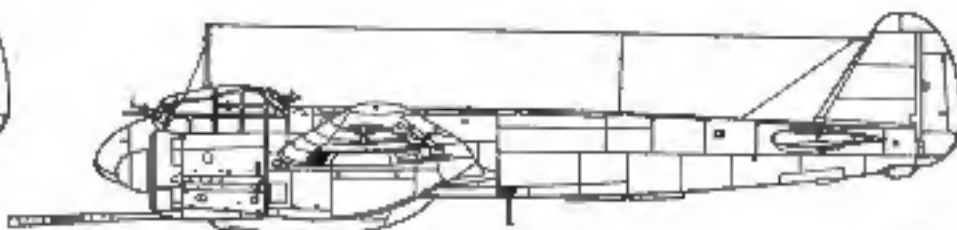
Ju 88C-5



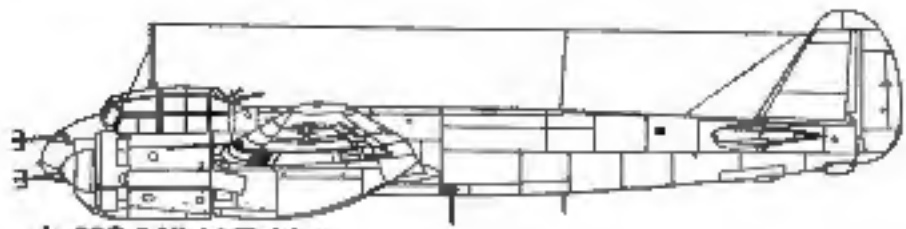
Ju 88G-6



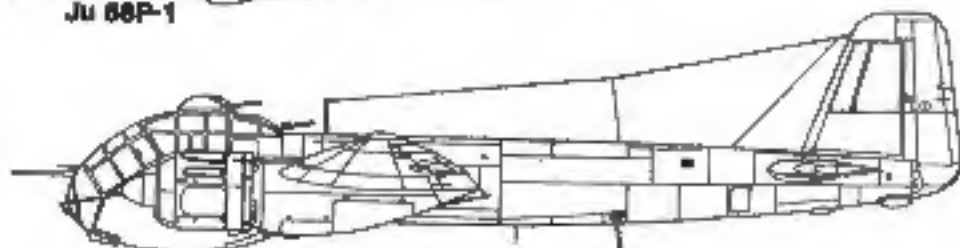
Ju 88C-8 Day Fighter



Ju 88P-1



Ju 88C-6 Night Fighter



Ju 188

Ju 88C-2

Since the planned Ju 88C-1 and Ju 88C-3 variants never entered production, the first operational Ju 88 *Zerstörer* was the Ju 88C-2, a direct conversion of the current production bomber variant, the Ju 88A-1. In most respects the Ju 88A-1 and the C-2 were externally identical, with the exception of the forward armament, the elimination of the underwing dive brakes and ETC bomb racks on the Ju 88C.

Like the *Zerstörer* prototypes, the Ju 88C-2 featured a metal nose cap, although some machines retained the bomber-type lower side windows on the forward fuselage. At the attachment point between the hollow nose cap and the forward fuselage, an 11mm thick armored bulkhead was installed for protection of the pilot. The bulkhead had an offset cutout for the nose guns to pass through. The armament consisted of three MG 17s (with 800 rounds per gun) and one 20mm cannon (MG-FF with 90 rounds, or MG 151 with 350 rounds). These weapons were mounted with a downward angle of approximately five degrees.

Like the Ju 88A-1 bomber, the Ju 88C-2 was powered by two 1,200 hp Junkers Jumo 211B or G engines, with optional flame dampers for the exhaust stacks. The Ju 88C-2 also retained the bomb bay bomb racks which were capable of carrying some 1,100 pounds of bombs. The forward bomb bay usually contained an auxiliary 316 gallon fuel tank. All external antennas for the FuG 10 and FuG 16 radios, FuBl 2 blind field approach radio, and the portside trailing antenna mast were retained unchanged from the bomber.

The first unit to officially receive the Ju 88C-2 was *Kampfgeschwader 30*, which had organized a special *Zerstörerstaffel* (destroyer squadron) while based in Norway during the Spring of 1940. From the outset, crews liked the Ju 88C. Its performance and 1,800 mile range proving to be very popular during coastal patrols and anti-shipping operations. During this same period, however, the Luftwaffe realized that its defenses against unexpectedly determined RAF night bombing raids were obviously inadequate. As a result, crews from *Z-Staffel/KG 30* were transferred to Germany for night-combat training during June.

In July of 1940, the task of forming a *Nachtjagd* branch in the Luftwaffe was given to *Oberst* (later General) Kammhuber, whose plans included the establishment of both short and long range night-fighting units. Short range interceptions could be assigned to Messerschmitt Bf 109 and Bf 110 fighters, while the larger Dornier Do 17 and Ju 88 fighter conversions, with their greater fuel capacities, would be used for *Fernnachtjagd* (extended night-fighting) patrols. By the end of July, the crews from *Z-Staffel/KG 30* had been incorporated into *II Gruppe* of *Nachtjagdgeschwader 1* and transferred to bases in Holland, with the principal air base being located at Gilze-Rijen. As part of *Oberst* Kammhuber's offensive strategy, *II/NJG 1* was soon assigned to nocturnal intruder raids against RAF bomber bases in England. The first two kills (Wellingtons) were claimed on 23 July 1940, by Do 17Zs. The number of kills escalated as *NJG 1* improved its coordinated tactics of bombing and strafing the British bases, attacking the bombers during their takeoff and landing patterns.

During September of 1940, *II/NJG 1* was redesignated as *I/NJG 2*. The unit continued to harass British airfields for the next year, compiling a total of 143 claimed victories. By Autumn of 1941, the Ju 88C-2 had been joined by the improved Ju 88C-4, both of which were in short supply since Ju 88 production was still concentrated on Ju 88A bombers. A total of sixty-two Ju 88C fighters were produced during 1940, opposed to 1,816 bombers and 330 reconnaissance variants.



The pilot of this Ju 88C-2 made a belly landing in Norway, tearing up the wings, engines and gondola. The lower fuselage side window, retained on some Ju 88C-2 conversions, has been broken out. KG 30 was the first unit to use the Ju 88C operationally, assigning the aircraft to a special *Zerstörerstaffel*. (E.C.P.A.)

Ju 88C-1 and Ju 88C-3

Generally believe to be a cancelled project, the Ju 88C-1 has been alternately described as a direct conversion of the Ju 88A-1 bomber with nose-mounted guns, both with and without a metal nose cap. Also, both the Jumo 211 in-line liquid cooled engines and BMW 801MA radial engines have been mentioned as the probable power plants. If fitted with Jumo 211 engines, the Ju 88C-1 would have closely resembled the Ju 88C-2.

Some sources have stated that Ju 88C-2s featured an increased wingspan. One possible explanation for this statement is that Ju 88 fighters entered production during a time when Ju 88 bomber variants were changing over from short to long-span wings (Ju 88A-1 to Ju 88A-5). As a result, Junkers may have adjusted the Ju 88C-2s for this change over, just as Ju 88A-1s were known to have been later remanufactured with longer wings.

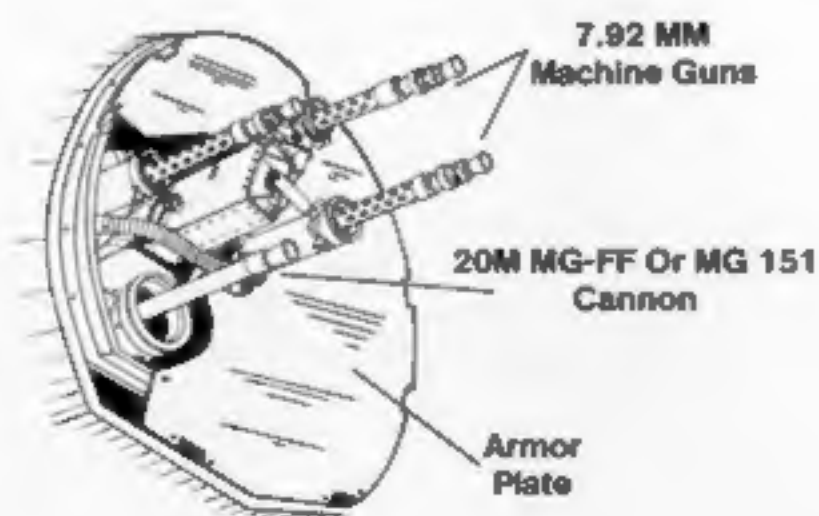
Most sources agree that the Ju 88C-3 was a planned variant using the BMW 801 radial engine as its power plant. These were never built since the RLM placed restrictions on the use of these engines.



Initially the forward canopy on the Ju 88C was unchanged from the Ju 88A-1. The pilot sighted his forward firing weapons with a Revi reflector gunsight. Although the windshield MG 15 machine gun was quickly deleted, the "dipped" starboard canopy framing was retained. (E.C.P.A.)

Armament Installation

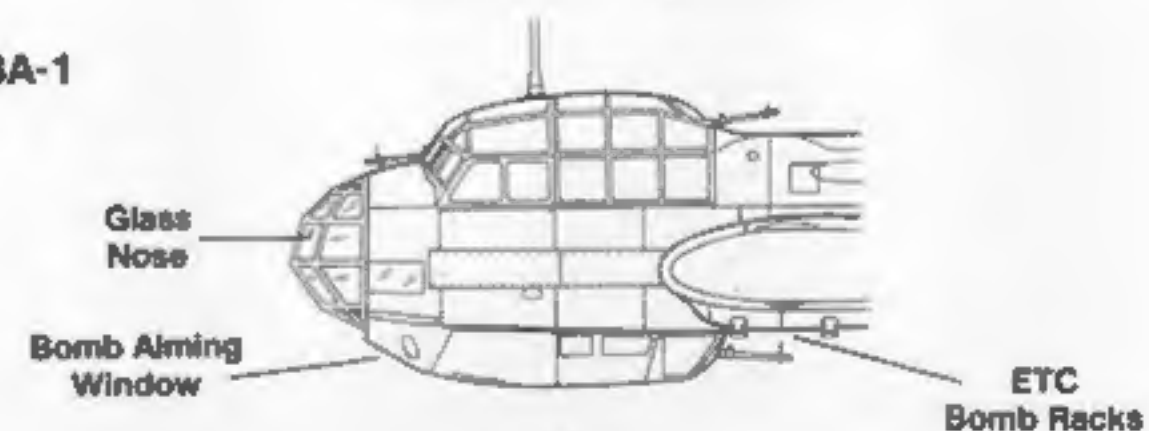
Ju 88C-2



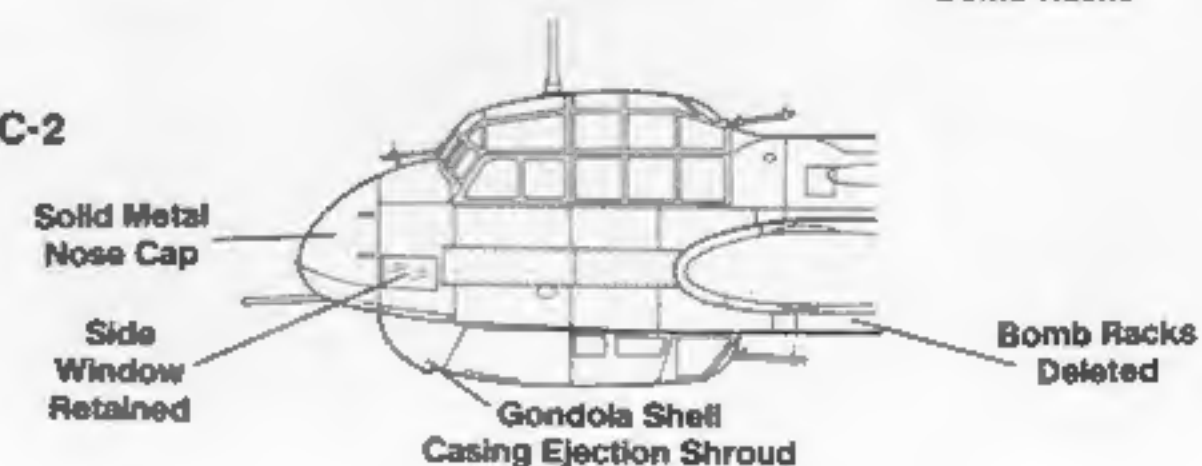
Power plant installations on Ju 88A bombers and Ju 88C fighters remained essentially the same, the 1,200 hp Junkers Jumo 211B or G engine. The original factory applied camouflage was Black Green and Dark Green upper surfaces over Light Blue undersurfaces. (Bundesarchiv)

Nose Development

Ju 88A-1



Ju 88C-2



Ju 88C-4

The Ju 88C-4 was essentially the fighter variant of the Ju 88A-5 bomber, which entered production during early 1940. Ju 88C-4s were dedicated fighter conversions of Ju 88A-5 airframes, with all bomber equipment being deleted and the lower forward fuselage windows being completely faired over.

The Ju 88C-4 used the Ju 88A-5 extended wingtips and inset ailerons, increasing the wingspan from 60 feet 3 1/4 inches to 65 feet 7 1/2 inches. The FuG 10 and FuG 16 antenna arrays were slightly modified and the under fuselage FuBl 2 rack antenna was moved further to the rear and enclosed in a plexiglass cover to reduce drag.

Power plant options allowed for the installation of either the Jumo 211G or the uprated 1,400 hp Jumo 211F engine. With the Jumo 211F engines installed, the Ju 88C-4 reportedly had a maximum speed of 307 mph.

The nose mounted armament remained the same as that on the earlier Ju 88C-2, although the optional MG-FF 20MM cannon was supplanted by a MG-FFM with a higher rate of fire. The option of using an alternate MG 151 cannon was also retained. The windshield mounted MG 15 machine gun, sometimes used on the Ju 88C-2, was deleted on the Ju 88C-4.

The Ju 88C-4 had an optional installation of two MG-FFM 20MM cannons in the ventral gondola. When these were installed, the spent shell casing shroud on the forward gondola was reduced in size and the rear firing MG 15 machine gun was normally deleted, as the breeches of the MG-FF cannons extended into the lower gun position.

Most Ju 88C-4s retained the single upper rear firing MG 15 machine gun used on the Ju 88C-2. By 1942, however, a number of Ju 88C-4s were field modified with a bulged rear canopy with two rear firing guns, high profile armored glass windshield panels, and exterior applique armor on top of the forward fuselage nose (like the later Ju 88C-6).

I/NJG 2 became the first unit to receive the Ju 88C-4, while the unit was flying night intruder sorties against RAF bomber bases; however, despite their success in this role, all nocturnal intruder raids were cancelled on 12 October 1941, for reasons both mathematical and political. In short, there were barely enough Ju 88Cs available to meet combat attrition and Adolf Hitler had dismissed the importance of intruder raids, preferring night interceptions of RAF bombers over the Reich to bolster civilian morale. For these missions, home based, short ranged Messerschmitt Bf 110s were considered to be more suitable than the Ju 88Cs.

Following the cancellation of intruder raids, I/NJG 2 was transferred to the Mediterranean and North African theaters in support of Italian and Afrika Korps operations. From bases in Sicily and later Benghazi, NJG 2 commenced operations during December of 1941. Typical missions were raids against Malta and escort missions for Axis air and sea convoys. The Ju 88Cs also conducted a number of daylight ground attack sorties in support of GEN Erwin Rommel's Afrika Korps.

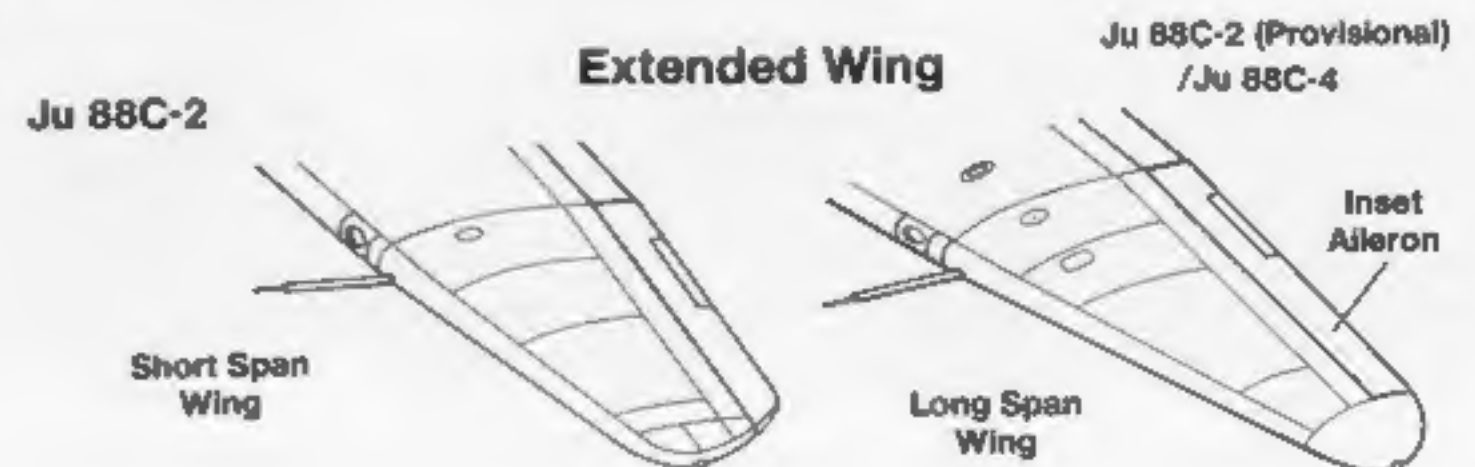


This Ju 88C-4 of II/NJG 1 had the nose cap removed for weapons calibration. Ju 88C-2s and C-4s of II/NJG 1 were repainted in overall Flat Black night camouflage and flame dampers were often fitted to the engine exhausts. (Manfred Griehl)

Although most Ju 88 fighter operations were concentrated in North Africa for the remainder of 1941 and early 1942, European based elements of II/NJG 2 and III/NJG 2 also received a number of Ju 88Cs.

The Ju 88C-4 was replaced on the production line during early 1942 by the Ju 88C-6. Again, only some sixty-six fighters had been produced in 1941 (compared to 2,700 Ju 88 bombers and reconnaissance versions).

Alternate German sources have also described the Ju 88C-4 as a *Zerstörer und Fernerkunder* (destroyer and long-range reconnaissance) variant, with Jumo 211F engines as standard. These sources state that the aircraft carried a single Rb 50/30 camera, Rb 20/30 camera, or an adjustable camera in the fuselage underside behind the rear bomb bay. These alternate descriptions have generated enough confusion that in some reference sources, two photographs of the same aircraft are identified as both a Ju 88C-2 and a Ju 88C-4.





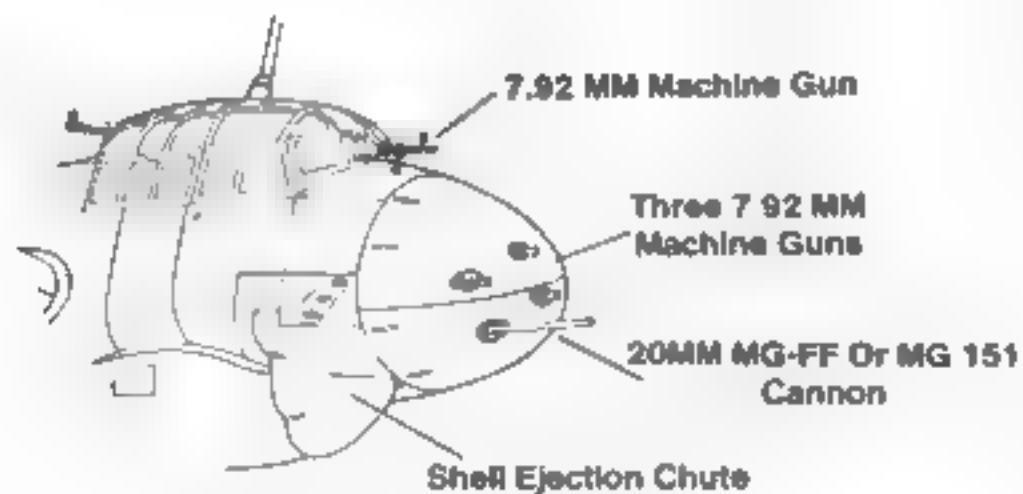
This Ju 88C is believed to be the aircraft flown by *Hauptmann* Hans Hushoff of I Gruppe/NJG 2 (previously II Gruppe/NJG 1). Various sources have described the aircraft as a Ju 88C-2 and a Ju 88C-4 (which are reportedly similar). The faint code on the fuselage (R4) is in Gray, a common practice on Black aircraft.



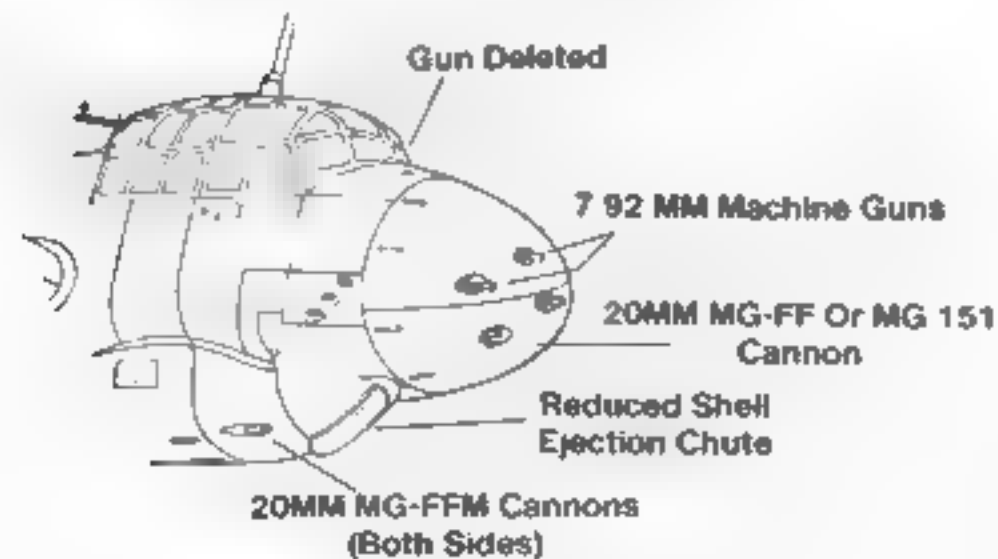
Following the cancellation of nocturnal raids against England, I/NJG 2 was transferred to the Mediterranean during late 1941. This aircraft (coded R4+FH) retained the overall Black camouflage and carried a White fuselage theater identification band. Again, sources have identified this long span aircraft as both a Ju 88C-2 and C-4.

Armament Development

Ju 88C-2

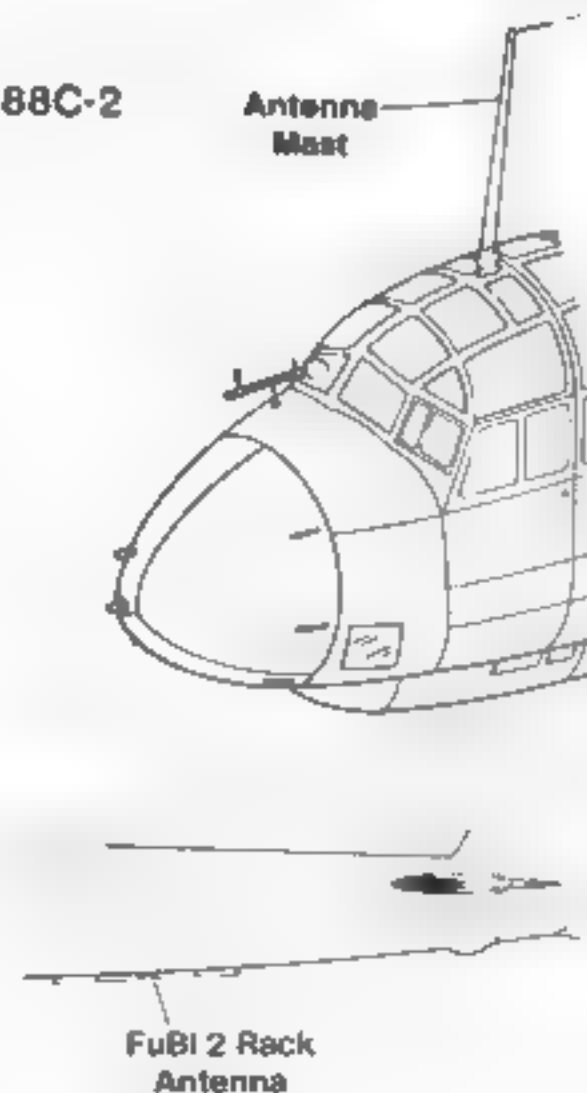


Ju 88C-4

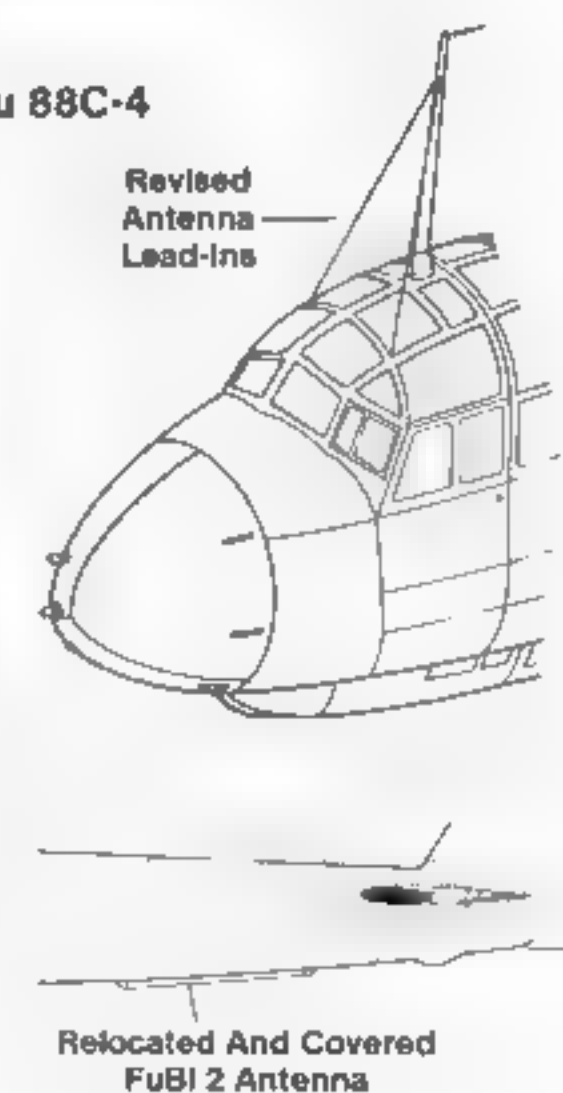


Antenna Configurations

Ju 88C-2



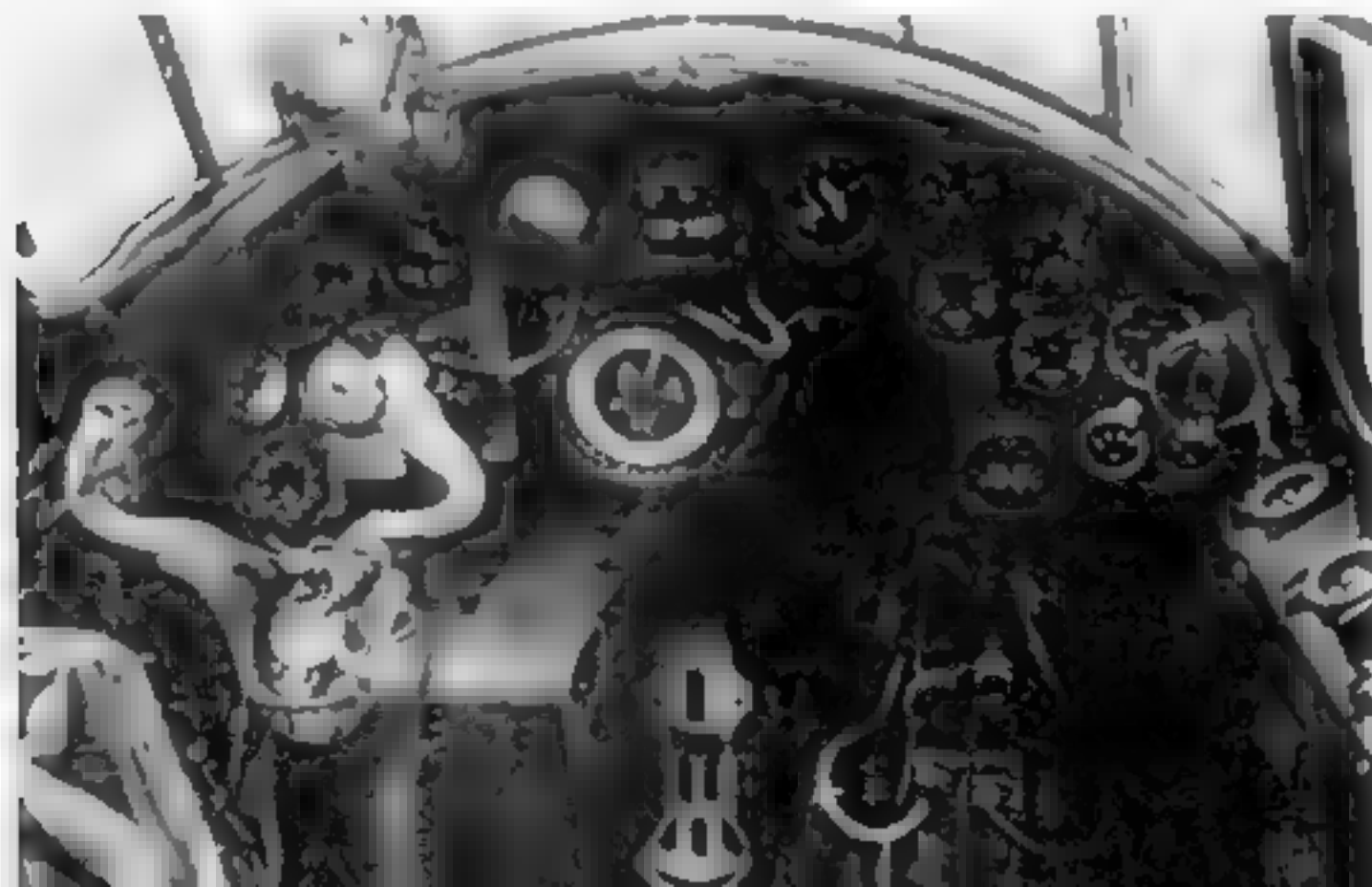
Ju 88C-4





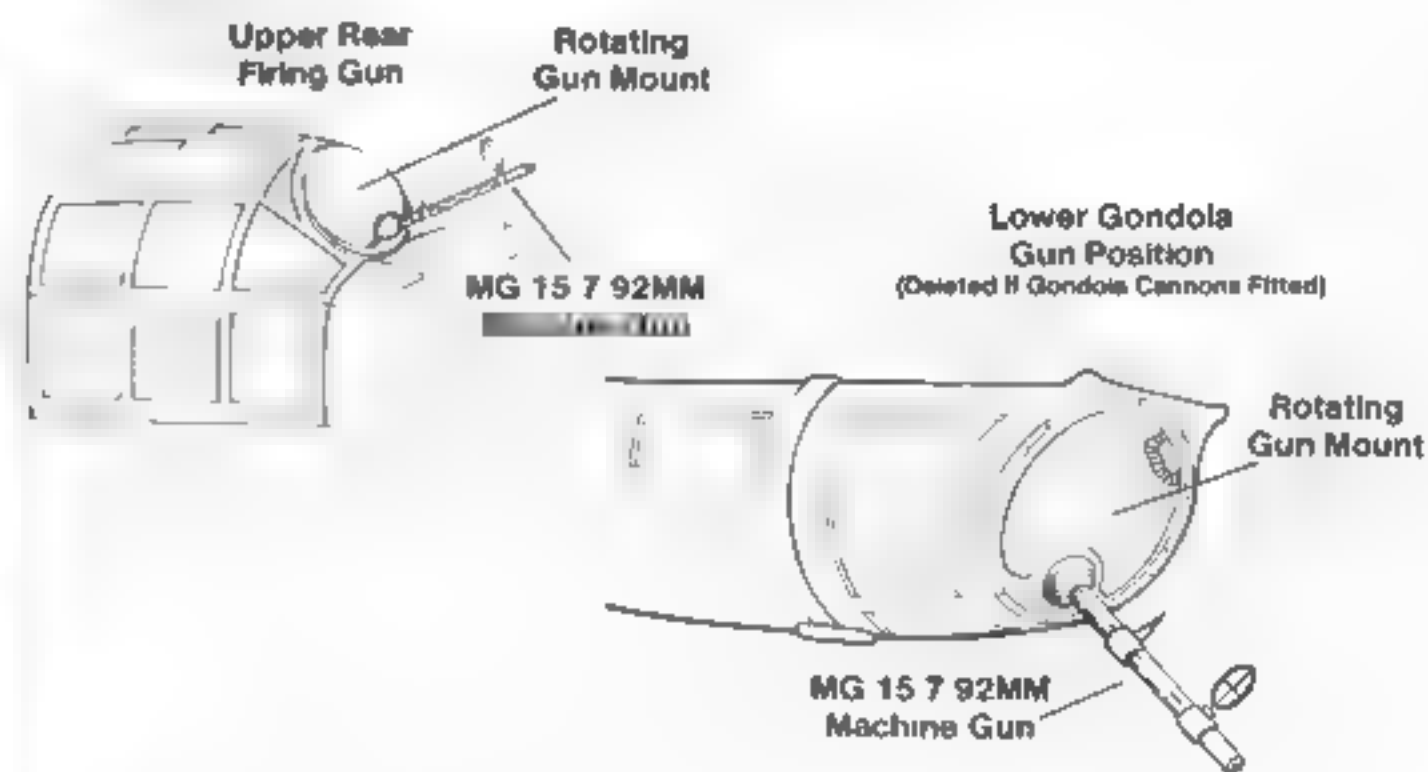
To increase crew protection, some Ju 88C-4s were retrofitted with a bulged rear canopy with two MG 15 gun mounts, an armored windshield and applique armor on the upper fuselage nose. This aircraft was coded R4+MT and was assigned to II/NJG 2 in Holland. It was finished in a two tone Gray uppersurface camouflage with Light Blue undersurfaces.

Extra instrumentation was progressively added to the instrument panel of Ju 88 fighters. The starboard side of the panel was enlarged and the compass was relocated to the pilot's side below the panel. The breeches of the nose guns are visible below the panel and the ammunition boxes for the MG 17 machine guns are located between the rudder pedals.



Defensive Armament

Ju 88C-2/C-4



Ju 88C-5

Although the RLM continued to reserve BMW 801 radial engines for other projects, Junkers was able to secure permission to produce a limited series of BMW 801 powered Ju 88 fighters under the designation Ju 88C-5. Due to the RLM restrictions and slow deliveries of the engines, only ten Ju 88C-5 airframes were actually completed.

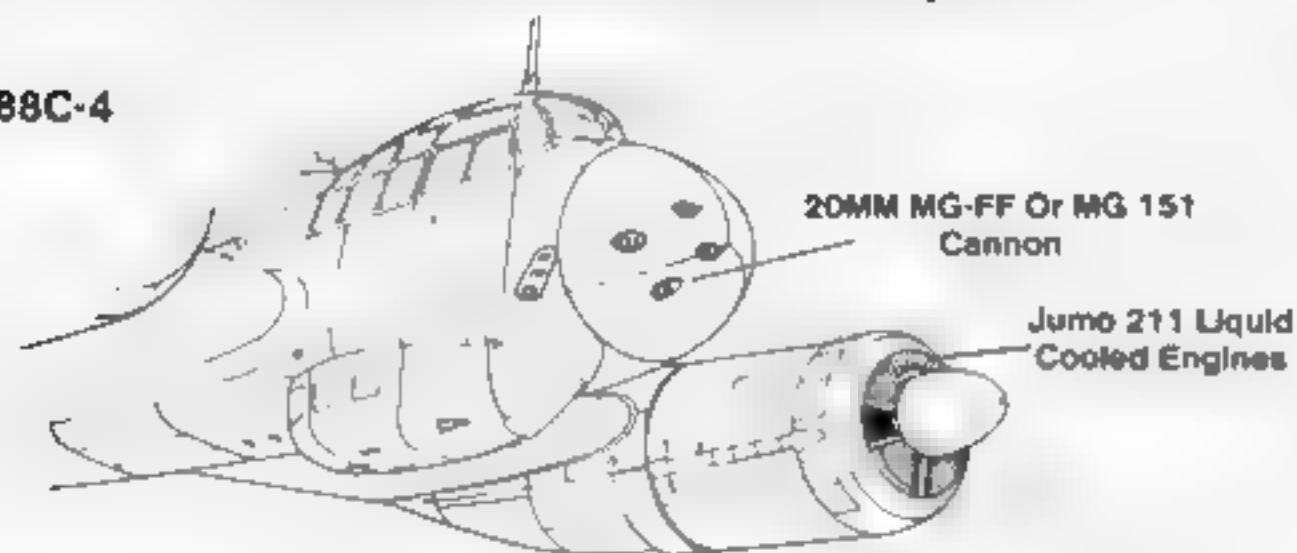
The Ju 88C-5 was a refined version of the Ju 88C-4, featuring BMW 801A engines driving VDM all metal three blade propellers. The ventral gondola was replaced by a small low drag under-fuselage weapons pod, which was offset to port. This pod contained two 7.92MM MG 17 machine guns with 1,000 rounds per gun. The guns were belt fed from ammunition tanks located in the rear bomb bay. As an experiment, an enlarged center-line weapons pod carrying two 20MM MG 151 cannons was installed on at least one Ju 88C-5.

Nose armament remained the same as that of the Ju 88C-4, with the optional long-barreled 20MM MG 151 cannon installed in the lower nose position. The shell casings for these weapons were ejected directly from ports under the forward fuselage. The crew entered the aircraft through a hatch located on the starboard fuselage underside.

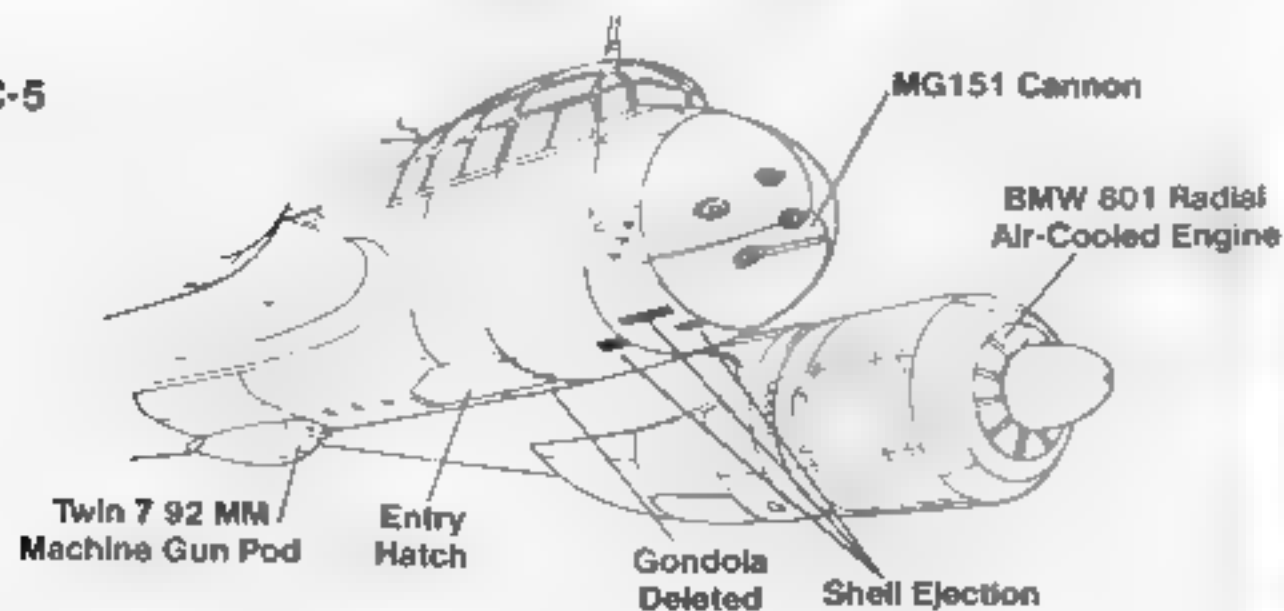
The few Ju 88C-5s airframes completed reportedly underwent service evaluation before being relegated to research and development work. The Ju 88C-5 was reportedly able to attain a maximum speed of 354 mph at an altitude of 19,680 feet.

Armament/Power Plant Development

Ju 88C-4



Ju 88C-5



Although similar to the Ju 88C-4, the Ju 88C-5 was equipped with BMW 801 radial engines and had the gondola removed. Crew entry was made through an underside entry hatch and the spent shell casings for the nose guns were ejected through underside ports. This Ju 88C-5 carried an optional long-barreled 20mm MG 151 nose cannon (an option for all Ju 88Cs).

To maintain forward firepower, the Ju 88C-5 was fitted with a weapons pod beneath the mid-fuselage. This pod housed two 7.92mm machine guns which were belt fed from ammunition tanks located in the rear bomb bay.



Ju 88C-6

During early 1942, the Ju 88C-6 was introduced on the assembly line. This fighter variant incorporated the various improvements made on its bomber counterpart, the Ju 88A-4. Although the pace of Ju-88 fighter production continued to be restricted, the RLM was beginning to realize the need for Ju 88Cs on the expanding war fronts. As a result, Ju 88 fighter production for 1942 was increased to some 257 machines and the Ju 88C-6 became the first Ju 88 fighter variant to be produced in substantial numbers.

The major change between the Ju 88C-4 and the Ju 88C-6 was the installation of 1,400 hp Junkers Jumo 211J-1 or J-2 liquid cooled engines in place of the Jumo 211F or G engines. The installation of these engines featured asymmetrical bulges under the cowlings and additional radiator air intakes in the radiator faces to feed the induction air coolers mounted below each engine. The thin chord VDM metal propellers were replaced by broad chord VS-11 wooden "paddle" blades with enlarged spinners. To handle the increased weight of the improved airframe, the undercarriage was strengthened and slightly larger tires were installed. Curiously, a number of early Ju 88C-6s retained bomber type underwing dive brakes, however, these were quickly discarded.

The forward-firing nose and ventral gondola armament remained the same as the Ju 88C-4, including the option of either a 20MM MG-FF or MG 151 cannon in the lower nose. For greater rear defense, the single rear firing upper MG 15 position was replaced by a bulged canopy with two belt-fed 7.92MM MG 81J machine guns in armored turrets (these guns had a faster rate of fire than the MG 15s). The ventral rear firing MG 15 position was replaced with a shallower Bola 39 or Bola 81Z turret, capable of mounting either an MG 15, MG 81J, 13MM MG 131 or a *Zwilling* (twin) MG 81Z machine gun. The under fuselage rear firing guns, however, were often deleted in favor of forward-firing 20MM MG-FFM gondola cannons.

Like the Ju 88C-2 and C-4, the Ju 88C-6 could carry a 1,100 pound bomb load in either bomb bay, or auxiliary fuel tanks (316 gallons forward, 175 gallons aft). According to official loading charts, a maximum weight of 27,668 to 29,864 pounds was possible by using both internal and underwing FFC racks. The underwing bomb racks were seldom used on Ju 88Cs and the average maximum weight was listed as 25,243 pounds. Maximum speed of the Ju 88C-6 at an average weight was approximately 310 mph.

Cockpit interior accommodations were similar to previous Ju 88Cs, although equipment updates led to the enlargement of the instrument panel to house additional instruments. The pilot's seat was changed to a fully armored seat and, for added crew protection, the internally mounted cockpit armor plating was increased. Additionally, exterior applique armor could be added to the upper fuselage nose. Although early Ju 88C-6s retained bomber type windshields, high-profile armor glass windscreens were progressively introduced on the production line and became the standard for the series.

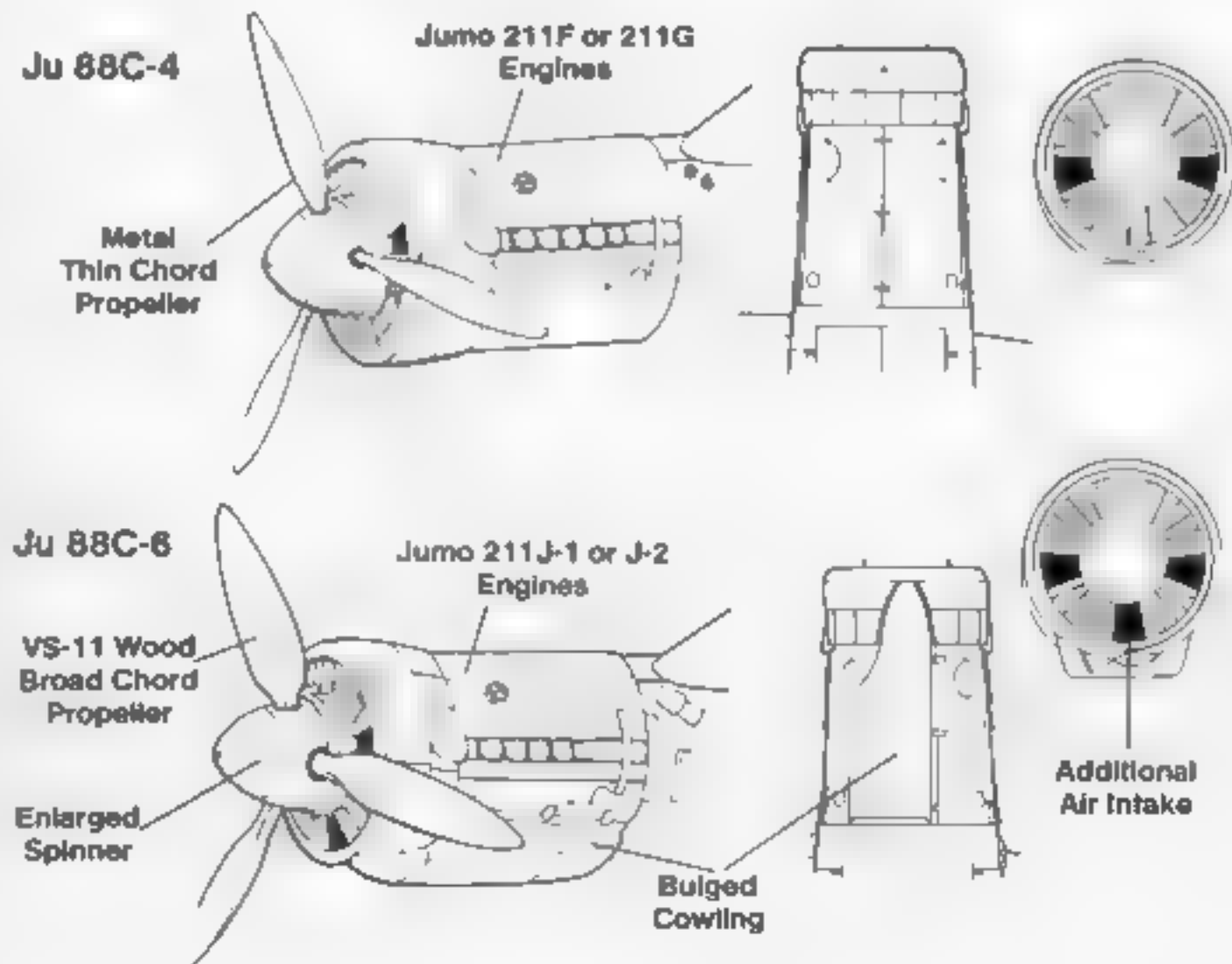
Early production Ju 88C-6s featured the straight rudder found on early Ju 88s (both bomber and fighter variants). This was soon replaced by a balanced rudder which changed the shape of the rudder hinge line. An FZ 6 direction finder antenna was added on the mid-upper fuselage and was sealed under a circular plexiglass cover. The antenna lead wires were also changed and later Ju 88C-6s carried FuG 10, radio altimeter antennas under the port outer wing. The under fuselage FuB 12 rack antenna was moved slightly forward, retaining its plexiglass cover.

One of the first units to receive the Ju 88C-6 was I/NIG 2 in the Mediterranean and North Africa, along with II and III Gruppen, which were based in Europe. While this seemed to indicate a primarily nocturnal role for the Ju 88C, many early Ju 88C-6s were,



The Ju 88C-6 was powered by Jumo 211J engines, featuring asymmetrical under cowlings, enlarged spinners and broad-chord VS-11 "paddle" blade propellers. This winter camouflaged C-6 is equipped a later Bola 81Z turret. The Bola hatch is open and its weapons have been removed, which was common.

Engine Development



in fact, issued to bomber units. These aircraft formed special *Zerstörer* squadrons for daylight escort and ground attack missions. The Ju 88C-6 was used on all fronts serving with KG 3, KG 30, KG 51, KG 53, KG 55, KG 76, KG 77 and ZG 26. By September of 1942, V KG 40 began using the Ju 88C-6 on anti-shipping patrols and maritime escort duties from coastal bases in France.

Like the Ju 88 bombers, the Ju 88C-6 was subjected to a number of field modifications. Some aircraft featured single rear firing upper gun mounts (using either an MG 81J or an MG 131 machine gun). Others had the ventral gondola removed to reduce drag and weight, increasing the top speed by some 15 to 20 mph. With the variety of features found on the Ju 88C, such as flame dampening exhaust shields, a number of different equipment combinations were possible.

Some Junkers project drawings for the Ju 88C-6 proposed a very shallow under fuselage ventral pod with two MG-FF cannons in place of the usual ventral gondola. This type of arrangement, however, was also attributed to the later Ju 88C-7 version.

Variable armament configurations and ammunition loads were specified for the Ju 88C-6 by using different sized internal ammunition bins and interchangeable drums for the MG-FFM cannons. Some possible configurations were:

Nose: Three MG 17 machine guns with 800 to 1,000 rounds per gun, one MG 151 cannon with 350 rounds, or one MG-FFM cannon with 90-120 rounds.

Forward Gondola: Two MG-FFM cannons with 90-120 rounds each.

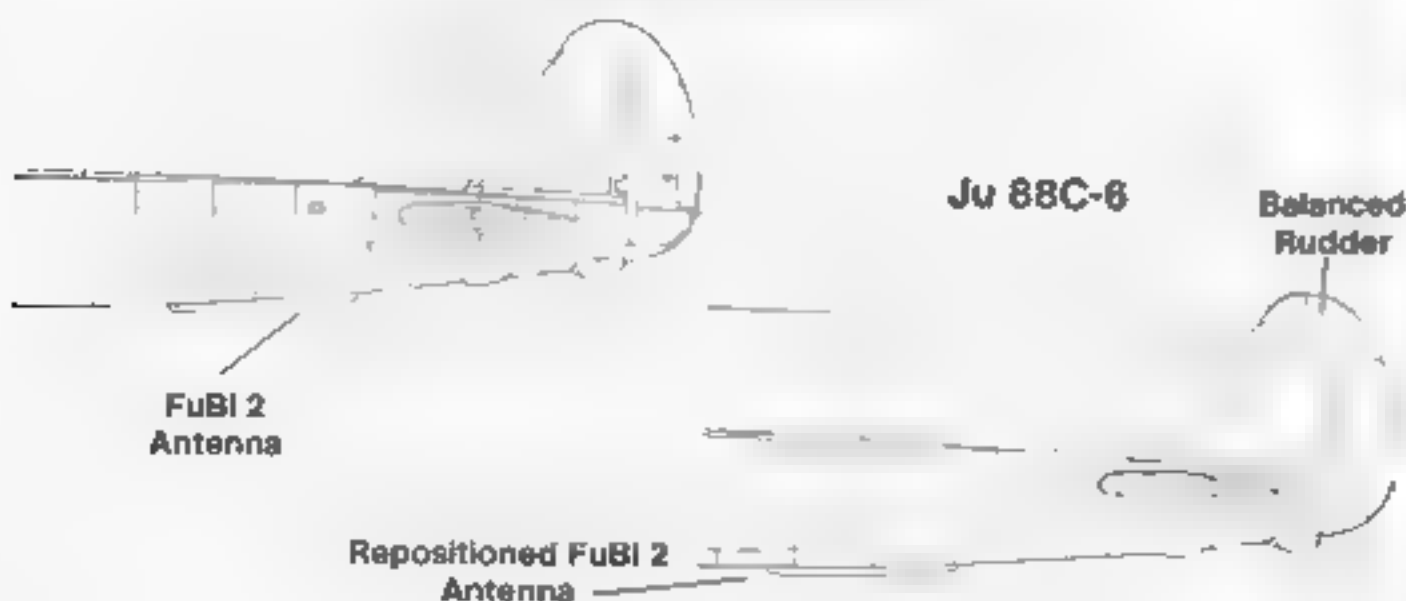
Rear firing upper position: Two MG 81J machine guns with 500-1,000 rounds per gun, or one MG 131 machine gun with 500-750 rounds.

Rear firing lower position: One twin MG 81Z machine gun (if carried) with 900, 1,000 or 1,500 rounds per gun.

Also, a number of sources have described a complicated use of Ju 88C-6 sub-variant designations (C-6a, C-6b and C-6c) but it is now known that these designations were provisional and did not officially exist. The same situation applies to similar designations assigned to the later Ju 88C-7, G-6 and G-7 series aircraft.

Ju 88C-4

Tail Development



Italian officers tour the Ju 88C-6 assembly line, where the pre-painted fuselage of SM+LT is being moved down the line to be mated with the wings. The Ju 88C-6 retained the bomb bays for carrying small bombs, usually in the rear bay. The notched fin tip will be fitted with a balanced rudder. (Bundesarchiv)

Armed with a battery of forward mounted guns, the Junkers Ju 88 bomber was transformed into an efficient *Zerstörer* heavy fighter. This Ju 88C-6 was assigned to *Kampfgeschwader 40* for antishipping duties. The squadron color (Yellow or White) was carried on the spinners and forward gondola. (Bundesarchiv)





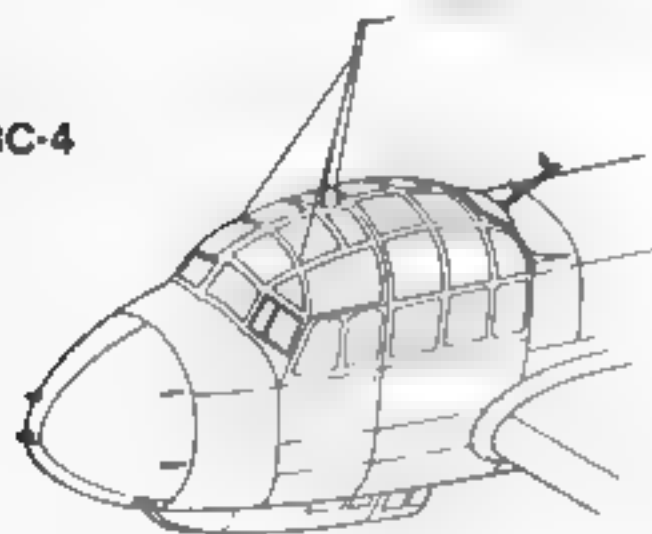
During the Winter of 1942-43, 4. Staffel/KG 76 painted false "bomber noses" on their Ju 88C-6s to trick Soviet pilots into making head-on attacks. F1+XM also carries the Staffel insignia of an enemy "duck" within the cross hairs of a gunsight. (Bundesarchiv)



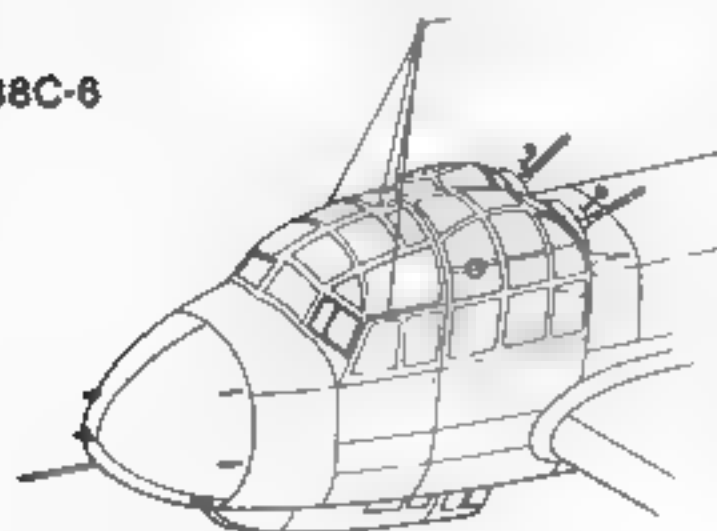
The underfuselage FuBl 2 antenna on this Ju 88C-6 was housed in a semi-transparent plexiglass cover. The small bulb behind the rack antenna is a White navigation light. The aircraft carries Temporary White camouflage which was typical for Eastern Front aircraft, along with the Yellow fuselage band. (Bundesarchiv)

Dorsal Weapons

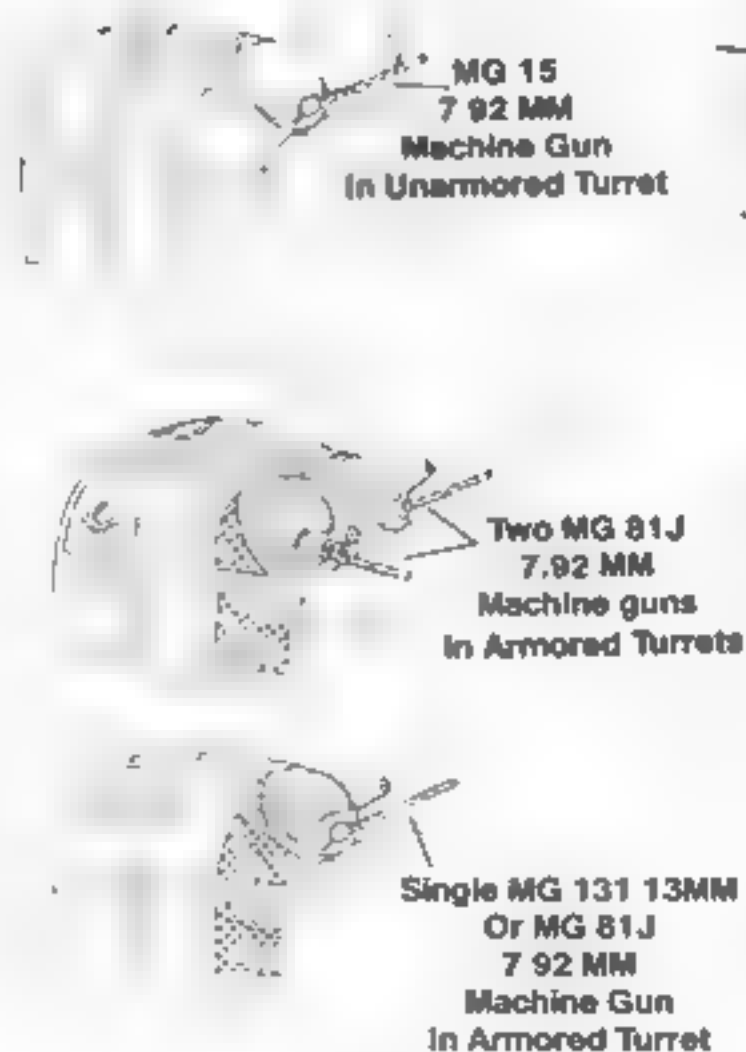
Ju 88C-4



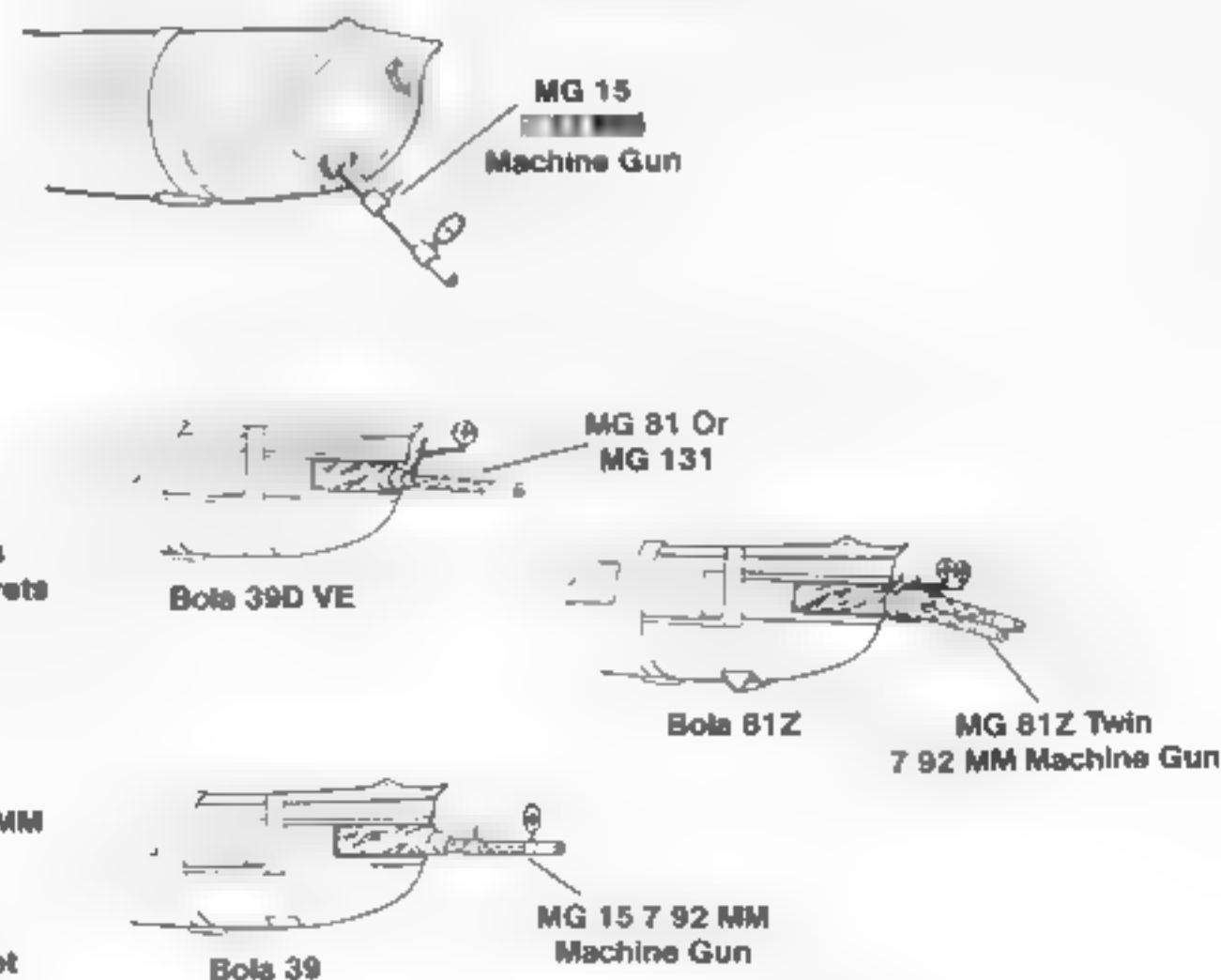
Ju 88C-6



Armament



Ventral Weapons





Most early Ju 88C-6s were assigned to *Zerstörer* duties with bomber units during 1942. This Ju 88C-6 was assigned to 8. Staffel of KG 3 *Blitz*, which was a well known tank and train-busting squadron on the Eastern Front. The spinners were Yellow and the Red unit shield featured a White lightning bolt. (Bundesarchiv)



Although Ju 88 fighters were rarely supplied to Germany's allies, a few were employed by the Hungarian Air Force on the Eastern Front. This Ju 88C-6 carries standard Hungarian insignia consisting of a White cross on a Black square. The aircraft also appears to have false "bomber windows" painted on the nose. (George Punka)

Antenna Development

Ju 88C-6



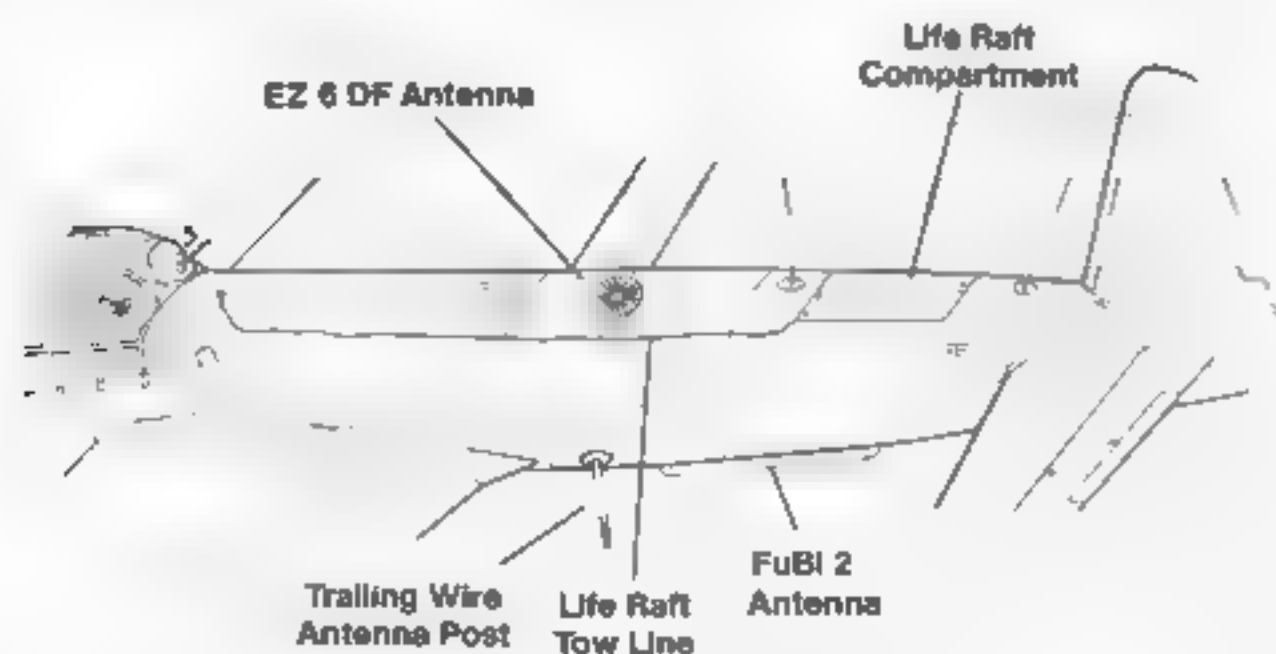
Ju 88C-6
(Late)

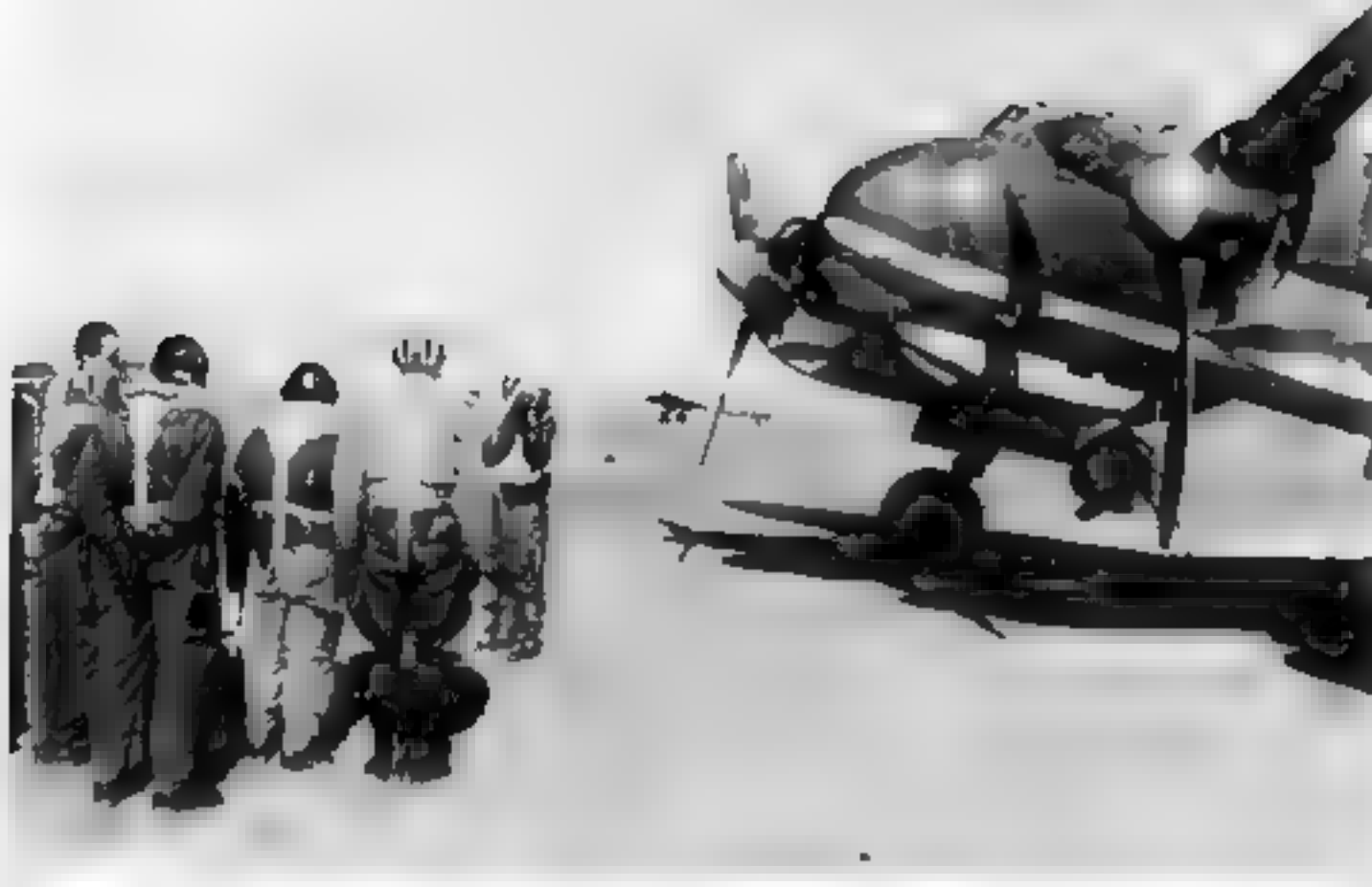


FuG 16 ZY
Loop
Antenna

FuG 25
IFF Whip Antenna

FuG 101 Antennas





Aircrews of 11. Staffel/ZG 26 are briefed for another mission in the Mediterranean theater. The Ju 88C-6 carries both the *Horst Wessel* unit shield and White diving eagle insignia. This aircraft appears to be an ex-night-fighter, equipped with an armored windshield and mounting stubs on the nose for radar antennas. The spinner tips are in Red. (Bundesarchiv)



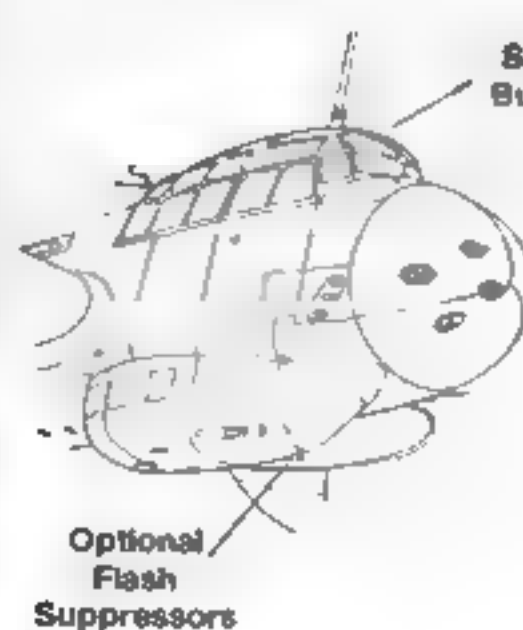
A pair of Ju 88C-6s of 11./ZG 26 on patrol over the Mediterranean. Although a variety of camouflage schemes were used by this unit (including desert Sand and Green patterns), these aircraft retain the factory applied Dark Green and Black Green upper surfaces over Light Blue undersides. (Bundesarchiv)

This aircraft is believed to be F1+KR of 7./KG 76, stationed in the Mediterranean. To increase the aircraft's speed, the gondola has been removed, a fairly widespread, but "unofficial" field modification. The camouflage is reportedly a Light Blue mottle over the standard factory applied camouflage (although Sand Brown was also a possibility). (Meixner)

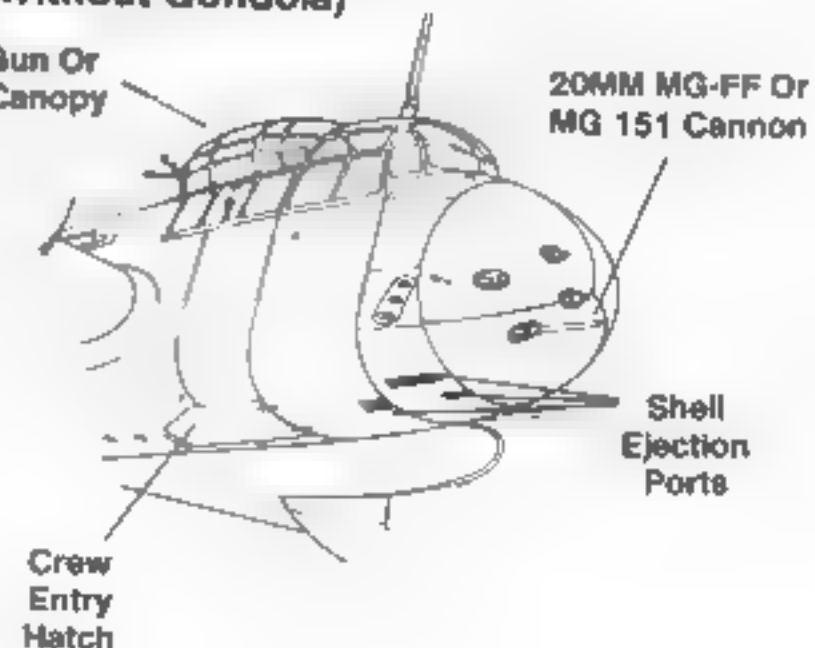


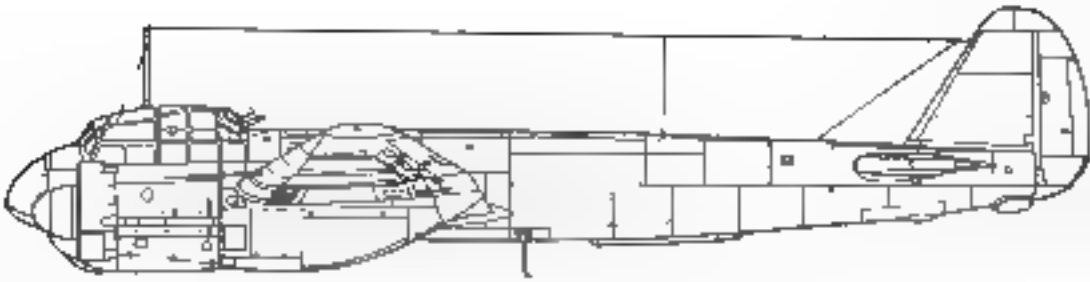
Nose Variations

Ju 88C-6
(Standard)



Ju 88C-6
(Without Gondola)





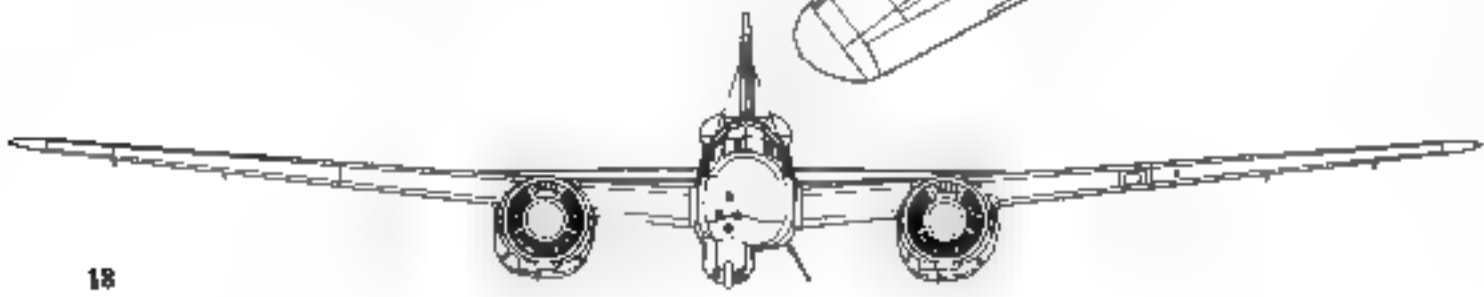
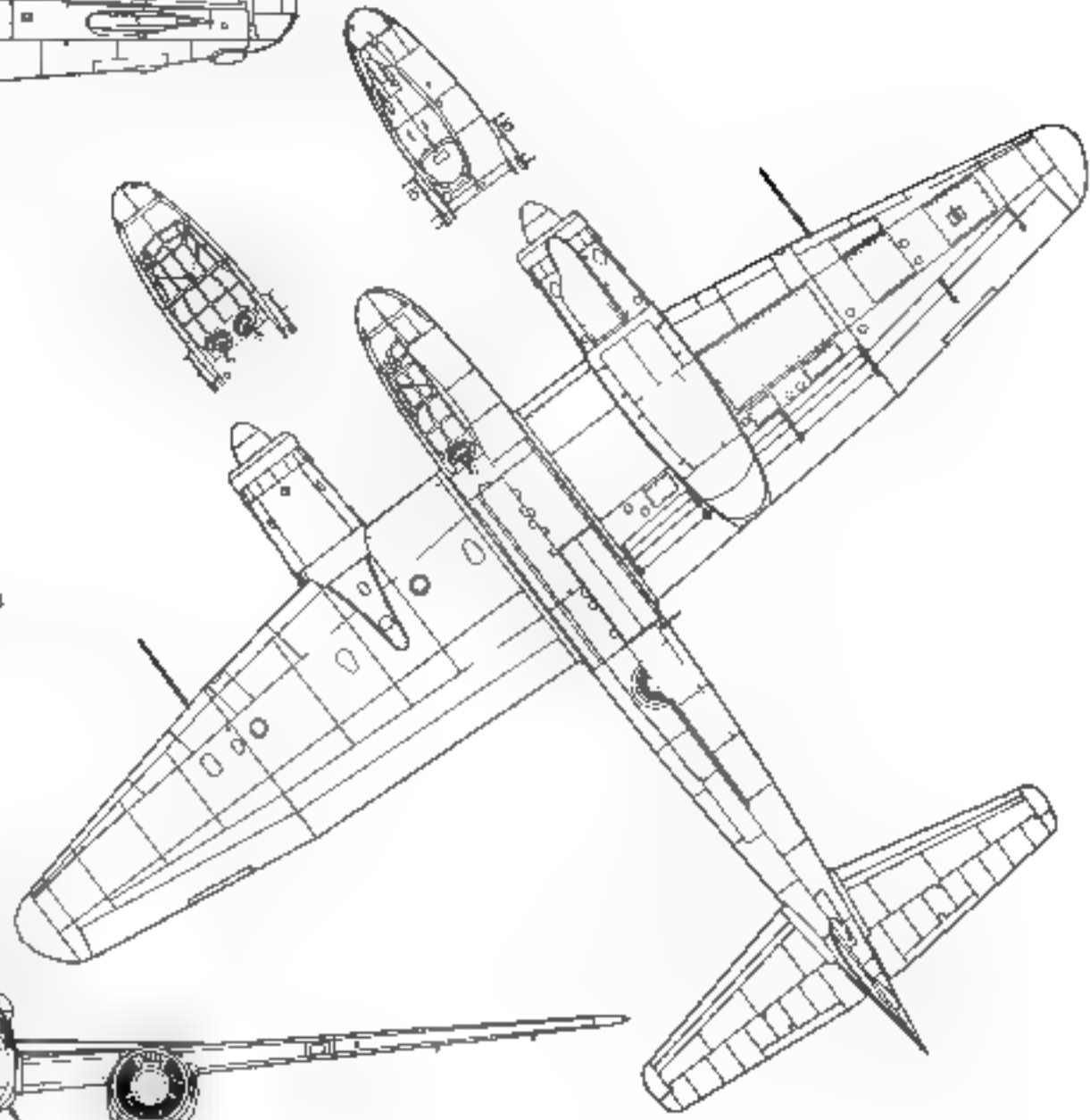
Specifications

Junkers Ju 88C-6

Wingspan -- 85 feet 7.5 inches
 Length -- 47 feet 6 inches
 Height -- 5 feet 11 inches
 Empty Weight -- 18,700 pounds
 Loaded Weight -- 26,243 pounds
 Powerplants -- Two 1,400 hp Junkers Jumo
 J21 J-1 (or J-2) liquid cooled
 engines.

Armament Three 7.92mm nose mounted forward
 firing machine guns, one nose mounted
 20mm cannon and two movable mounted
 20mm cannons. Defensive weapons
 include upper and lower rear firing
 machine guns (7.92 or .3in). Up to
 11,000 pounds of bombs.

Performance --
 Maximum Speed -- 310 mph
 Service ceiling -- 29,040 feet
 Range -- 1,829 miles
 Crew -- Three or Four



Ju 88C-6 Night Fighter

During late 1942, the Ju 88C-6 became the first Ju 88 fighter variant to be equipped with onboard air intercept (AI) radar and by mid-1943, the Ju 88C-6 was being used more extensively in the long-range night fighter role. Some *Nachtjagd* units initially received Ju 88C-6s without radar on an interim basis. The first radar-equipped aircraft were often identical to early production day fighters, but with nose-mounted radar antennas. Other equipment details, such as various defensive armament installations, flame dampening exhausts, and gun flash suppressors, could vary between aircraft within the same unit.

Ju 88C-6s were equipped with the early FuG 202 *Lichtenstein BC* followed by the FuG 212 *Lichtenstein C-1* radar sets. These were replaced by the improved FuG 220 *Lichtenstein SN-2* radar during the latter part of 1943. A very few Ju 88C-6s were also tested with an additional tail warning antenna mast for the SN-2 while still others were retro-fitted with the secret FuG 227 *Flensburg* passive homing device.

Over the course of its development, the Ju 88C-6 *Nachtjager* evolved into a recognizable late-production standard. The last of the C-6s were equipped with the large "antler" antennas (FuG 220 radar), single rear firing upper gun mounts with MG 131s, extended flame dampening exhaust shrouds, and the replacement of the under fuselage FuB 2 antenna with an FuG 25a IFF (Identification Friend or Foe) whip aerial and an FuG 16ZY D, F loop antenna. To offset the speed loss created by these equipment additions (and weight increases), some night-fighter pilots requested that the armament be reduced, or the ventral gondola be deleted.

By mid-war, the Third Reich was utilizing the Ju 88C-6 as its second most important night defense weapon, equipping several *Gruppen* within NJG 1, 3, and 6 (Europe), NJG 2 (Mediterranean) and NJG 100 and 200 (Eastern Front). Other units were equipped with Ju 88C-6s as the production tempo increased and by the end of 1943, just over 700 Ju 88 fighters had been produced (more than double 1942 totals). Production of the Ju 88C-6 tapered off by early 1944, shifting to the improved Ju 88G series.

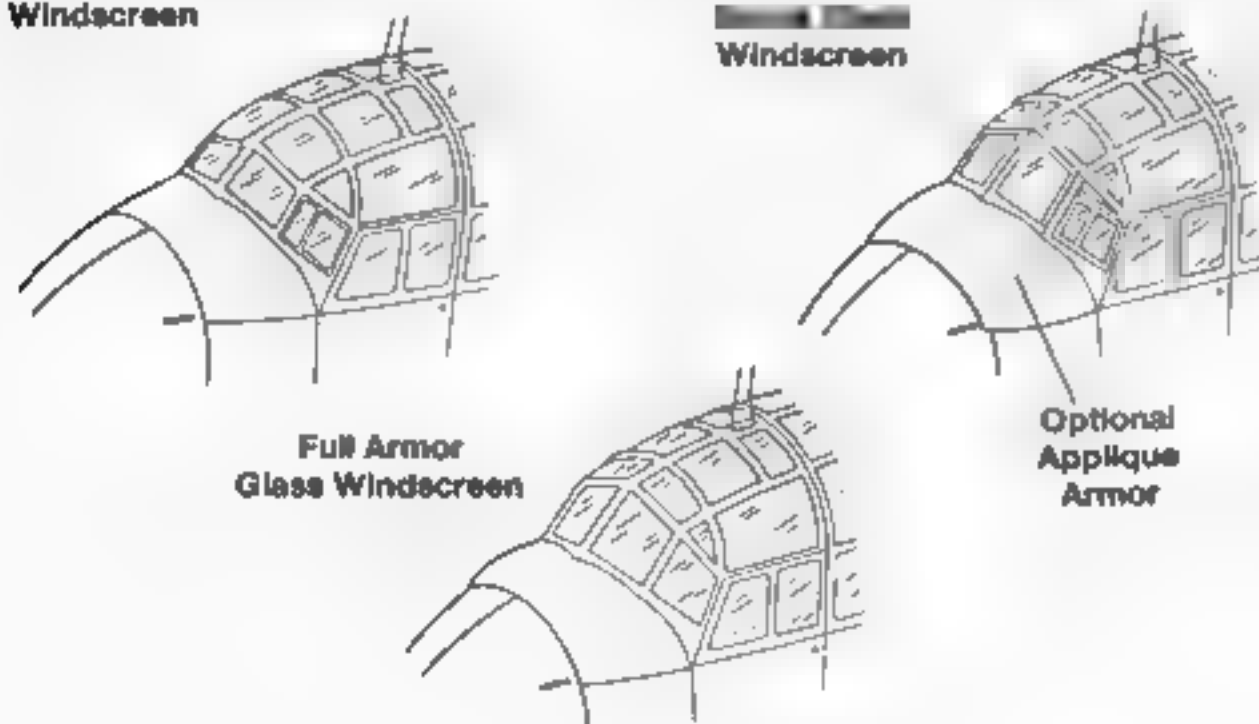
Windshield Development

Bomber Type
Windscreen

Partially
Windscreen

Full Armor
Glass Windscreen

Optional
Applique
Armor



During late 1942, Ju 88C-6s were increasingly assigned to night-fighter units. This Ju 88C-6 of NJG 2 was repainted in a "Speckled" variation of the interim (and widely differing) Gray night-fighter camouflage. The cowings were finished in Green and the *Englandblitz* shield of the *Nachtjagdverbände* was carried on the nose. (Manfred Griehl)

Camouflaged in the factory applied two tone Green scheme, this Ju 88C-6 has had all national insignia overpainted in Black. The aircraft has been fitted with extended exhaust shields, an armored windscreen and flash hiders on the guns. Ju 88C-6 day fighters were issued to night-fighter units while waiting for radar equipped aircraft. (Hans-Heinz Stapfer)



Night Operations 1942-44

At the beginning of the Second World War Nazi Germany had poorly prepared for the nocturnal raids of the RAF Bomber Command, with defending Luftwaffe pilots forced to engage RAF bombers visually. Later *Kombinierte Nachtjagd* (Combined Night Fighting) tactics were employed over selected German cities. These tactics called for ground control radar stations to guide the fighters to the bombers within a designated "fighter zone." Then the bombers were then tracked to a "flak zone" located nearer the target. The hazard of Luftwaffe fighters being fired upon by their own guns as they accidentally entered "flak zones" severely limited the effectiveness of these tactics.

A more efficient system, known as *Himmelbett* (Canopy Bed) was devised by GfN Kammhuber to coordinate ground and aerial defenses behind a chain of *Fresca* long-range and *Wurzburg* short-range ground radar stations. These were installed along the frontiers of Nazi occupied Europe facing England. Still, it was realized that night fighters needed an onboard radar to individually home in on British bombers once they were guided to the target by the *Himmelbett* ground-controllers. Early attempts at providing the night fighters with a night sight using infrared devices met with only limited success.

With the advent of FuG 202 *Lichtenstein BC* onboard radar during 1942 (followed by the FuG 212 *Lichtenstein C-1* during early 1943) the Luftwaffe night fighters were finally able to track and intercept RAF bombers with great accuracy. Unfortunately, during the late Spring of 1943, the RAF developed the capability to jam the FuG 202 and 212 radars, as well as the *Wurzburg* ground sets. This jamming was accomplished by dropping bundles of *Window* (a code name for foil strips cut to one-half the wavelength of FuG 202-212). This created a clouded radar image leaving German ground controllers confused as to the true size and location of an enemy formation. Fortunately, this crisis was soon resolved by the introduction of the FuG 220 SN-2 radar.

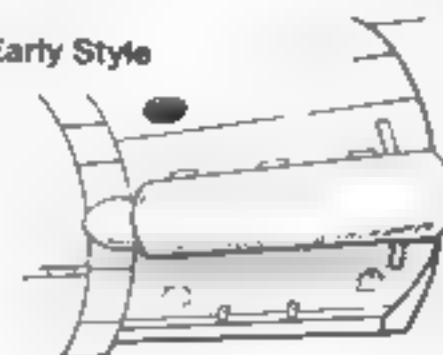
As the radar-equipped night fighters were restored to their full capabilities, a superior tactic, known as *Zahme Sau* (Tame Boar) was perfected for use by Ju 88 and Bf 110 units. Once a Luftwaffe fighter had infiltrated a British bomber formation, it would mount a long distance pursuit in an effort to pinpoint and destroy as many bombers as possible. So successful was this tactic, that the RAF began to suffer considerable losses, the worst being the night of 30-31 March 1944, when the RAF lost ninety-seven out of 775 bombers that were dispatched against Nuremberg, Germany.

On the Eastern Front, the nocturnal air-war was less demanding since the Soviets had failed to organize a major night bombing campaign against Germany. Because of this, the two principal eastern *Nachtjagd* units, NJG 100 and NJG 200, operated on a mobile "freelance" basis for front line tactical interceptions, using a variety of radar equipped aircraft. Like the Eastern Front, night activity in the Mediterranean and North Africa was also limited, although NJG 2 did receive a number of radar-equipped Ju 88C-6s before that unit was finally pulled back to Italy.



By 1943, German nightfighters had adopted the "light scheme" camouflage of overall Light Blue with a variable Gray-Violet mottle on the upper surfaces. Theoretically, this made them less visible at twilight. Many early Luftwaffe nightfighters were retroactively refinished in this type of scheme. (Manfred Griehl)

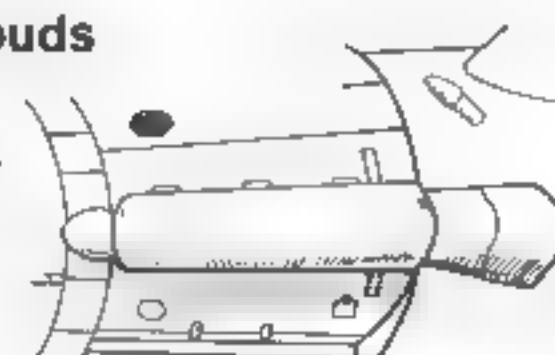
Early Style



Partial (Ju 88C-2, C-4, C-6)

Exhaust Shrouds

Later Style



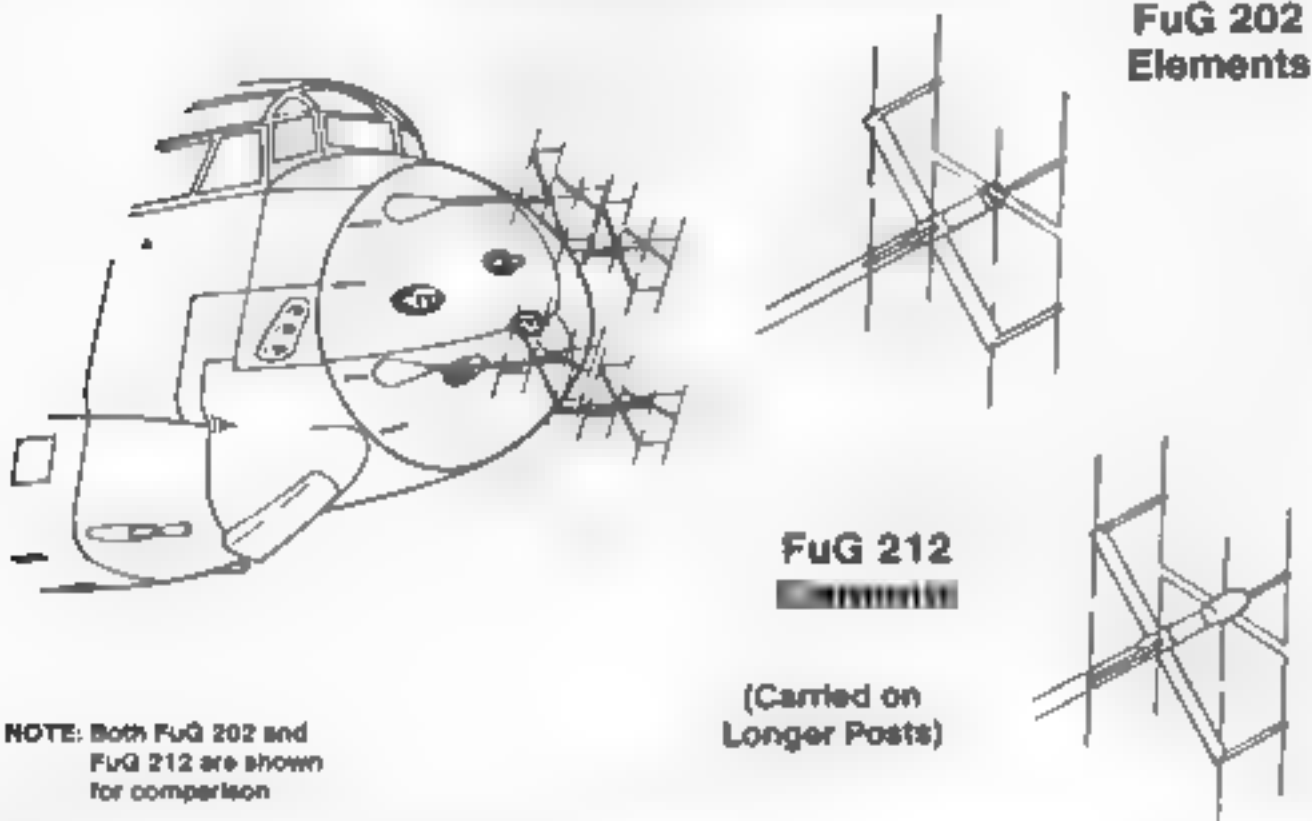
Extended (Ju 88 C-6 Late)

FuG 202 *Lichtenstein BC* And FuG 212 *Lichtenstein C-1* Radars

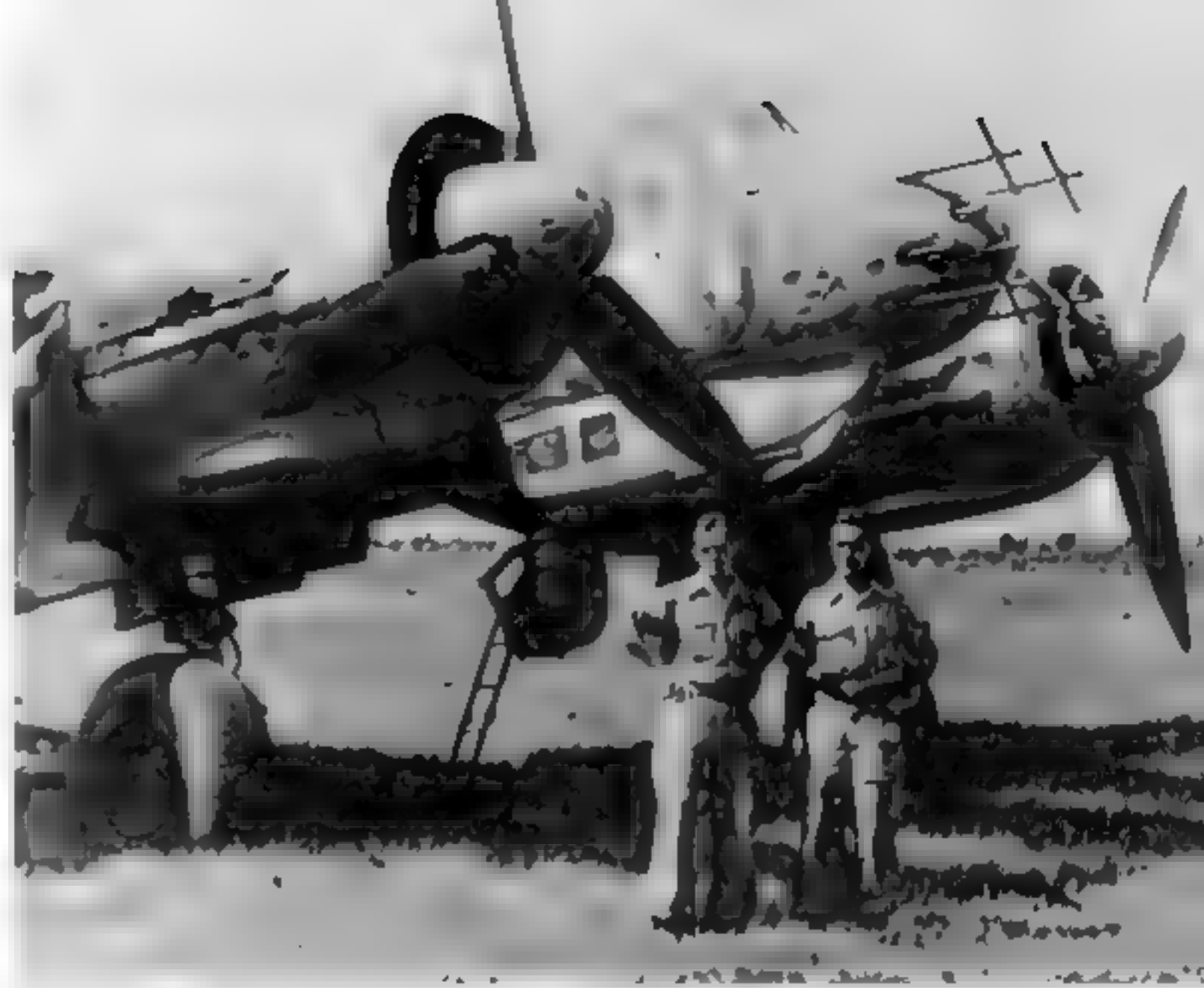
The FuG 202, which entered production during the Spring of 1942, was the first widely used, practical airborne radar employed by the *Nachtjagd*. Externally, it could be identified by four horizontal main masts which projected from the nose of the Ju 88 at a downward angle of approximately five degrees. At the tip of each mast was an "X-frame" supporting vertical dipole elements. The FuG 202 operated at 490 MHz with a maximum range of 2.5 miles and a minimum contact range of 200-218 meters (660-720 feet).

During the late Spring of 1943, the FuG 212 *Lichtenstein C-1* entered production as a simplified version of the FuG 202, with roughly the same performance. Physically it differed from FuG 202 in having longer main masts and a revised housing at the tip of each mast. By late Summer of 1943, the FuG 202 and 212 were being jammed by the Allies and their use fell off drastically.

FUG 202/212 Radar Antenna



During 1943 Ju 88C-8 production had been increased to meet the demands of Germany's night-fighter units. This Ju 88C-8 of 3./NJG2 is fitted with FuG 202 AI radar. The Ju 88C-8 was the first Ju 88 variant to operationally employ onboard air intercept radar (Manfred Griehl)



Although night combat was concentrated over western Europe, a number of radar-equipped Ju 88C-8s were supplied to I/NJG 2 in the Mediterranean. This aircraft featured an FuG 202 radar, with non-standard horizontal dipoles, an armored windshield and flash suppressors on all forward guns.

Ju 88C-8s were fitted with both the FuG 202 and the later FuG 212 radar (the two being similar). This Ju 88C-8 *Nachtjager* has been equipped with FuG 212 radar and extended flame damping exhaust shields. (Manfred Griehl)

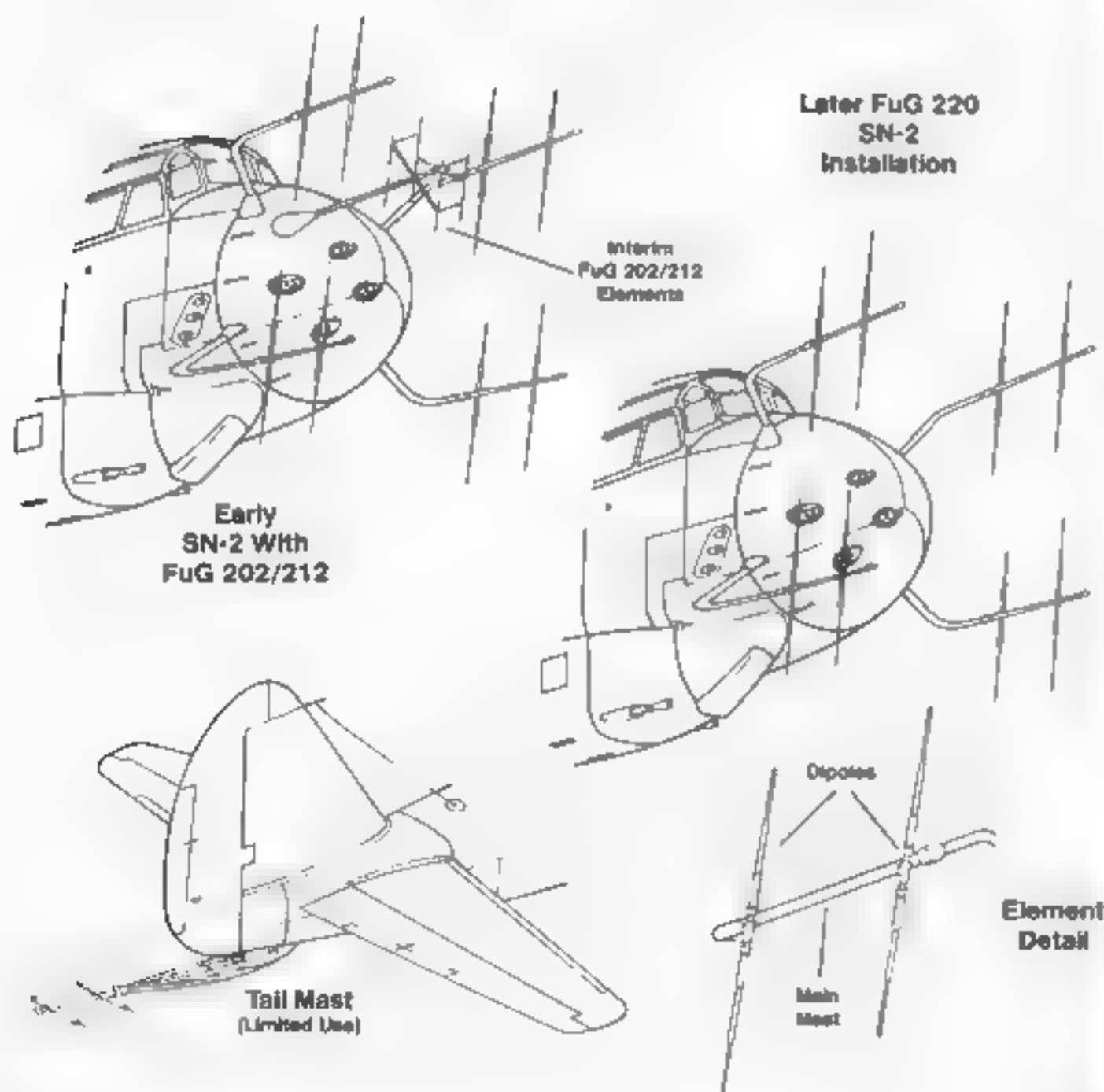


FuG 220 Lichtenstein SN-2 Radar

Although RAF jamming had led to disuse of the FuG 202 and FuG 212 radars, the problem was soon solved by the availability of the FuG 220 SN-2 radar, which had been developed in a close parallel to the earlier radars. The SN-2 radar was identifiable by its four large curved main masts, each supporting two vertical dipoles. The entire arrangement was again angled downward about five degrees.

One drawback with early SN-2s (Model O and Model A) was its lack of close contact range, its minimum range being 547 yards (over 1,600 feet). To balance this, either FuG 202 or 212 sets were briefly carried to maintain a close interception capability. With later SN-2s (Model B) the inclusion of a close-range switchover capability reduced the minimum range and the FuG 202/212 elements could be completely eliminated. FuG 220 SN-2 initially operated at a frequency of 91 MHz, offering a maximum range of approximately 3.125 miles (16,500 feet).

FuG 220 SN-2 Radar



Due to its lack of short-range capability, FuG 220 SN-2 radars were briefly augmented with FuG 202 or 212 elements. FuG 202/212 radar, which was easily jammed, was completely eliminated once an improved FuG 220 was introduced with its own short-range switchover capability. The extra FuG 202/212 radar could be carried in single, dual or standard four masted configurations.

The flat dipoles on this Ju 88C-6 have been credited as being either an aerodynamic refinement of the FuG 220 SN-2 or the serials of the SN-3 derivative. This aircraft had the gondola removed and its forward guns reduced to a single nose cannon. Such modifications were unofficially made to night fighters as much as with Ju 88 day fighters. (Manfred Griehl)





Although few Ju 88C-6s survived until the end of the war, this aircraft was discovered by the Allied troops during the Spring of 1945. The aircraft is equipped with the FuG 220 SN-2 radar. Final production Ju 88C-6s were standardized with the FuG 220 radar during late 1943. (Jim Mesko)

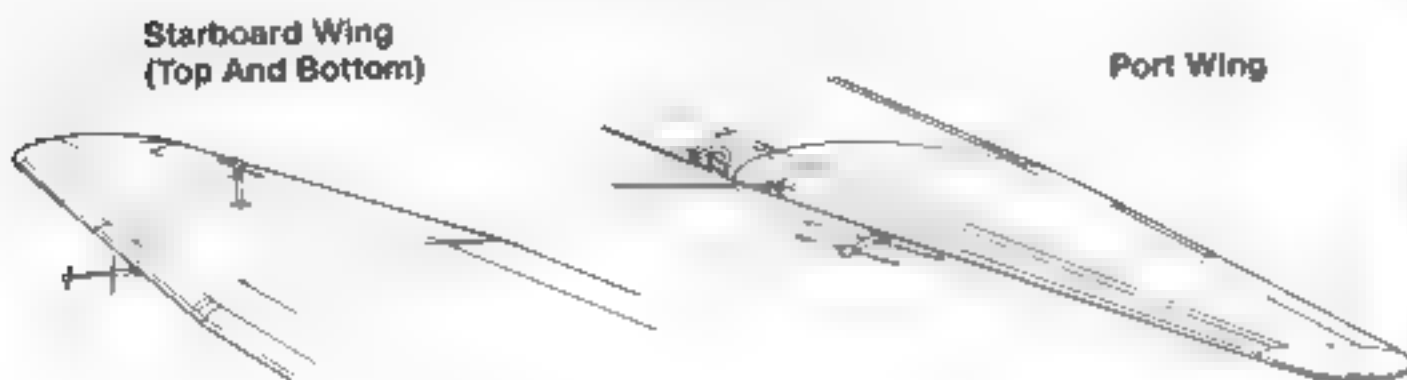


Retreating Germans left a "surprise" for unwary Allied souvenir hunters! Fortunately, this Ju 88C-6 was examined and a warning sign was suspended between the radar antennas. The object under the Ju 88 is the forward bomb bay auxiliary fuel tank. Early main masts for the FuG 220 radar antennas were tubular in shape with triangular airfoil bases. (Jim Mesko)

FuG 227 Flensburg Radar

Although not frequently used on the Ju 88C-6, the FuG 227 was occasionally retrofitted to the aircraft after it became available in quantity. *Flensburg* was designed as a passive homing device, which could detect emissions from the *Monica* tail-warning radars of British bombers. Under ideal conditions the bombers could be detected at ranges of up to forty-five miles. The FuG 227 installation was characterized by additional antennas which projected from the leading edges of the outboard wing panels and from the top and bottom of the starboard wing. Production of the FuG 227 commenced during the Spring of 1944.

Flensburg Antennas



Some Ju 88C-6s were retrofitted with the FuG 227 *Flensburg* passive homing device, which detected emissions from the *Monica* tail-warning radars carried by RAF bombers. FuG 227 was identified by the wing mounted antennas. (Imperial War Museum)



Schräge Musik Armament

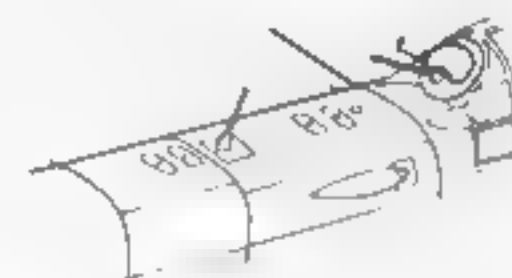
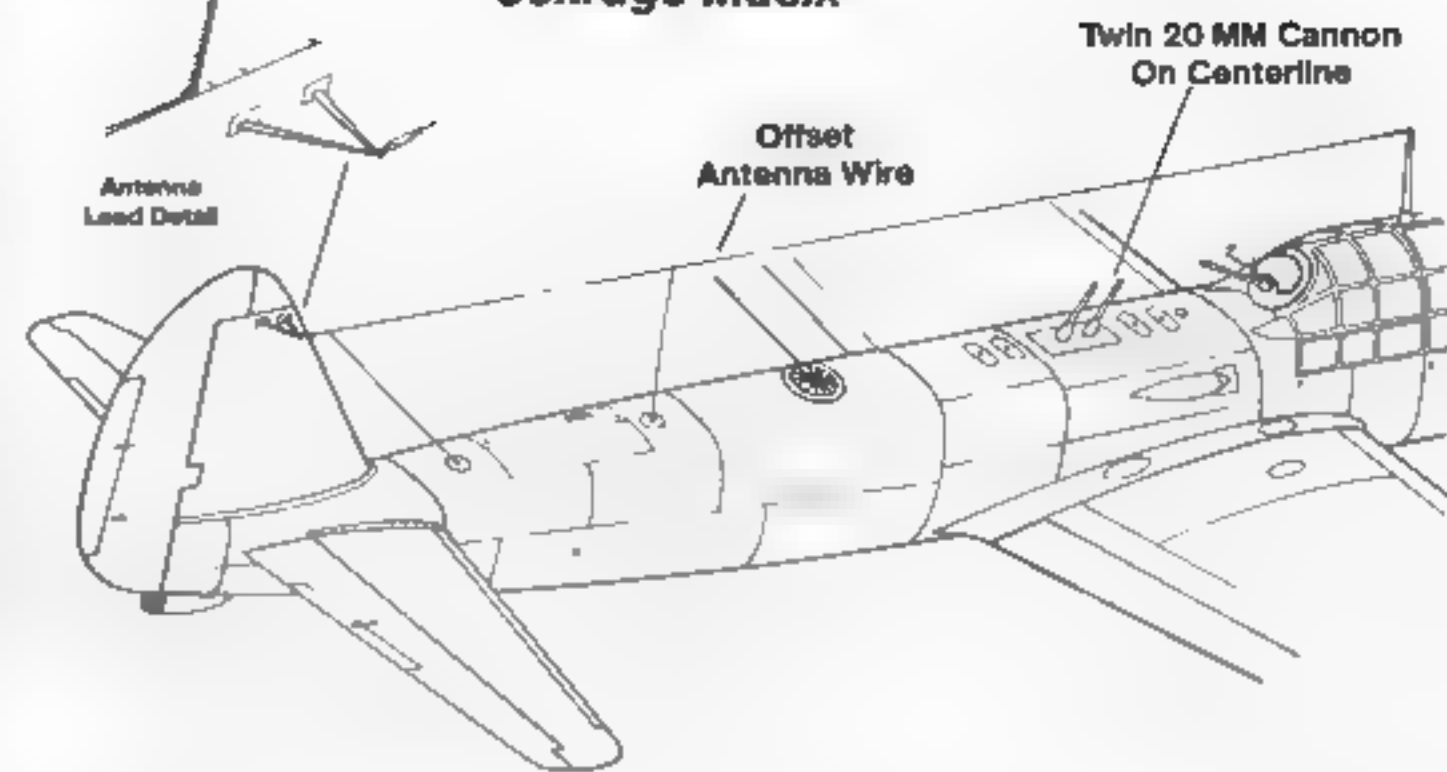
One of the most effective armament modifications made to Luftwaffe night fighters was *Schräge Musik* (Jazz or Oblique Music), an installation of one or two upward firing cannons mounted in the fuselage spine. First appearing during late 1943, the *Schräge Musik* installation (one or two MG-FF or MG 151 20mm cannons) was mounted at an angle of between 70 to 80 degrees forward. This allowed the German night-fighters to attack British bombers in their blind spot (below and to the rear).

The Ju 88C-6 was the first Ju 88 fighter to be modified with this installation and the cannons were usually mounted in the bomb bay area. The empty shell casings were often ejected through ports in the lower bomb bay doors. There were several variations found on Ju 88C-6s, some of which were field modifications. To give the centerline mounted guns a clear field of fire, the overhead FuG 10 antenna wire was realigned with the addition of a horizontal mounting bracket on the vertical fin tip. Aiming of the cannons was accomplished by using a gunsight mounted on the upper canopy framing above the pilot. In time, belt-fed long-barreled MG 151 cannons became the most utilized *Schräge Musik* weapon, with ammunition loads of up to 500 rounds per gun.

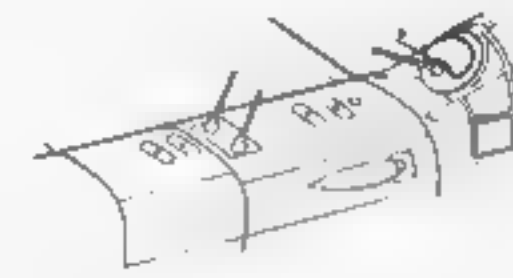
This battered late Ju 88C-6, coded 4R+AS, was piloted by Hauptmann Tober of 8./NJG 2. It was equipped with FuG 220 radar, an armored windshield, applique armor and a single rear firing 13mm MG 131 machine gun. Forward-angled 20mm MG 151 *Schräge Musik* cannons were installed in the upper fuselage. (Manfred Griehl)



Schräge Musik



Single Cannon Installation



Twin Cannons Variation

Ju 88C-7

Various sources have described the Ju 88C-7 as a project which was undertaken to improve the Ju 88C's speed and interception capability. Other sources have maintained that the C-7 was intended to be a radarless, streamlined *Tag Zerstörer* variation of the Ju 88C-6. In either case, the Ju 88C-7 was an aerodynamic refinement of the Ju 88C-6 airframe, described in German documents as being "like the Ju 88C-5". While some sources have indicated that there was an under fuselage forward weapons pod on the Ju 88C-7, other German sources have described a more rearward mounted pod with two MG-FF cannons or MG 17 machine guns, again similar to the Ju 88C-5.

Production of the Ju 88C-7 was apparently limited to only a few machines. One example of a Ju 88C-7 is mentioned in a wartime evaluation report dated 23 June 1942. The C-7, coded K9+VH, was reportedly equipped with two BMW 801D radial engines with a GM-1 nitrous-oxide boost system (no armament was described). Other sources have maintained, however, that Jumo 211J in-line engines were also employed during Ju 88C-7 development.

Ju 88R-1

The Ju 88R-1 was an interim development of the Ju 88C -6, intended to provide the Ju 88 with increased power and speed. The Ju 88R-1 differed from the Ju 88C -6 in the installation of two 1 600 hp BMW 801A radial engines in place of the Jumo liquid cooled engines. This installation was cleared by the RLM which now sanctioned the availability of these power plants for use on Ju 88s. Two small air intake scoops were also added to the engine nacelle just in front of the landing gear doors. Additionally, the front landing gear wheel well doors were redesigned with rounded leading edges. Because the BMW 801's exhausts glowed when hot, exhaust shields were added to the rear of the engine cowlings on late Ju 88Rs.

The forward firing armament remained unchanged from the Ju 88C -6, and a single, upper rear firing MG 81J or MG 131 machine gun position was standard on the Ju 88R. It is believed that the Ju 88R series seldom carried alternate armament configurations, such as *Schräge Musik* cannons, although field modifications were always possible.

Unlike the Ju 88C -6, the Ju 88R was not used for daylight operations and the majority were fitted with airborne intercept (AI) radar, most commonly the FuG 202 *Lichtenstein BC* and FuG 212 *Lichtenstein C-1* for the night-fighter role.

The Ju 88R-1 entered service during early 1943, stationed at Luftwaffe bases in Germany and occupied Europe. Within a few months after its combat introduction, a Ju 88R-1 of 10./NJG 3 (coded D5+EV) landed at the British airfield at Aberdeen Dyce on 9 May 1943. Amid conflicting reports that its crew defected or strayed off course, this particular Ju 88R had actually been chosen as the "escape ship" for an important foreign agent who had pre-arranged his arrival with Allied Intelligence.

Following a detailed examination of the radar equipment and mock aerial combat in which the captured Ju 88 was pitted against a Handley-Page Halifax bomber, the British

Other than the BMW 801A radial engines, the Ju 88R-1 was externally identical to the Ju 88C-6. Most Ju 88R-1s were fitted with either the FuG 202 or 212 radar. This aircraft was D5+EV of NJG3, which defected to Dyce airfield on 9 May 1943. (Hermann P. Dörner)



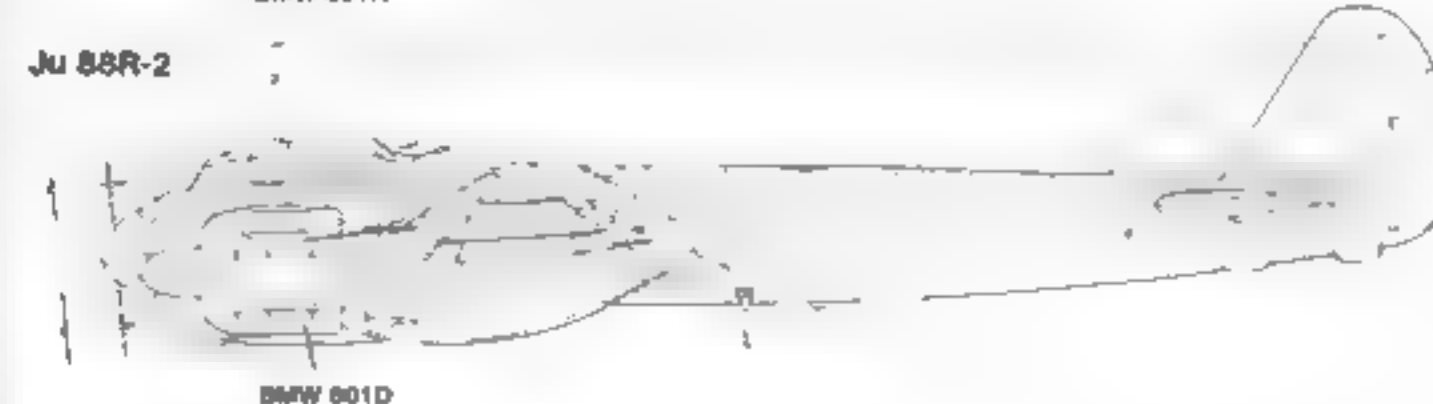
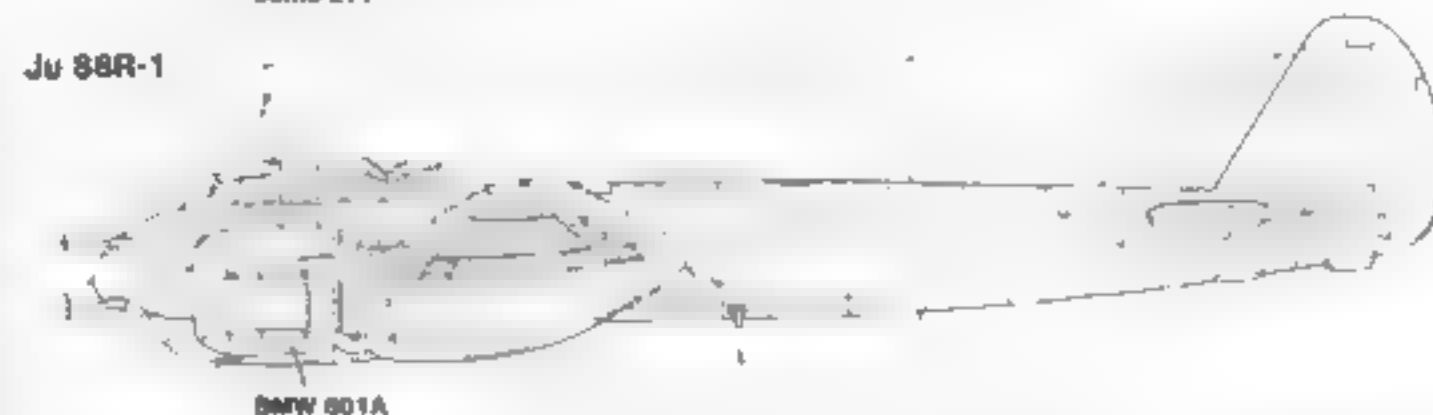
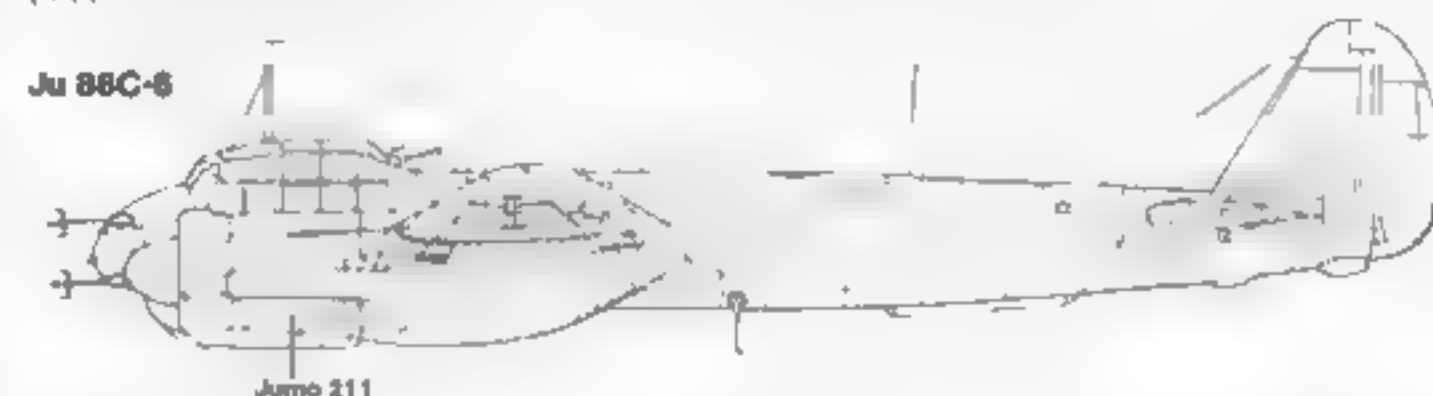
were able to neutralize FuG 202, FuG 212 and *Wurzburg* ground-control radar units by using simple bundles of air-dropped metal foil strips called *Window*, which jammed the radars.

Ju 88R-2

Entering production shortly after the Ju 88R-1, the Ju 88R-2 differed in having more powerful 1 700 hp BMW 801D radial engines in place of the 1 600 hp BMW 801A engines. These engines required a modification to the engine cowling, with additional upper cowlings fairings being added to accommodate internal air and exhaust system revisions. With these new power plants the Ju 88R-2 was able to attain a top speed of 359.6 mph, at an average weight of 25,353 pounds.

The Ju 88R-2 standardized the use of the high profile armored windshield. In response to Allied jamming of FuG 202 and FuG 212 radars, the Ju 88R-2 carried the FuG 220 SN-2 radar with large antler antennas. Additionally, the under fuselage FuB 12 antenna was usually replaced by FuG 25 and FuG 16ZY aerials.

Armament was identical to the Ju 88C -6, however, field modifications did occur. Optional accessories, such as flash suppressors or rear cowl exhaust shields, could vary from aircraft to aircraft. Production of the Ju 88R series ceased during early 1944.

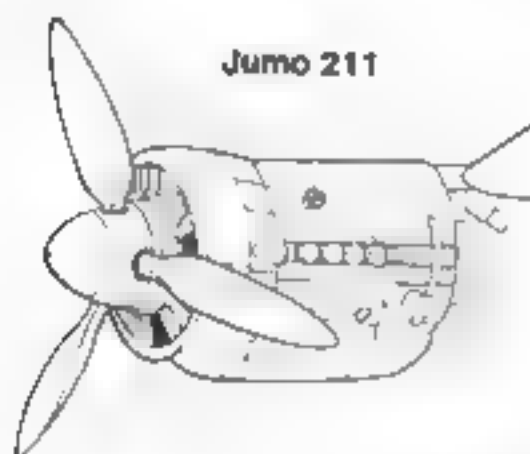




Pilots of No 1426 Enemy Aircraft Flight, RAF, examine D5+EV which had been stripped of much of its equipment and repainted in British colors. Following evaluation of the Ju 88R-1, the RAF were able to jam FuG 202 and 212 radar. Just visible are the rounded forward landing gear doors. (Imperial War Museum)

Engine Development

Ju 88C-6

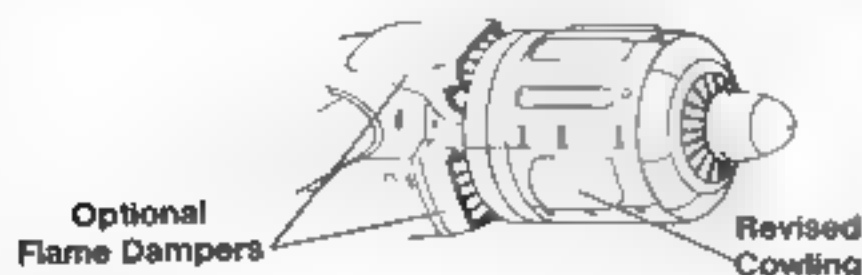


Ju 88R-1



Ju 88R-2

BMW 801D



The Ju 88R-2 differed from the Ju 88R-1 in having more powerful BMW 801D radial engines and FuG 220 SN-2 radar. This aircraft has been oversprayed with a tight "Squiggle" pattern of Light Blue and has had its nose armament reduced to two guns. (Melxner)

Ju 88G Development

As the Ju 88R began entering service, Junkers designers were already working on its replacement: a clean, more heavily armed Ju 88. The Ju 88V-58 prototype was constructed as a composite airframe, powered by two 1,700 hp BMW 801D radial engines. The wings and fuselage were similar to the Ju 88R-2, but the tail featured the board chord vertical stabilizer and extended horizontal tailplanes of the Ju 188. These modifications were carried out to improve directional stability. Revisions to the engine and wing deicing system resulted in the addition of shrouded hot-air outlets under the wing leading edges just outboard of the engine nacelles. For added crew protection, cockpit armor was increased, including the more extensive use of exterior applique armor.

The ventral gondola and three nose mounted MG 17 machine guns were deleted. Armament consisted of six belt-fed 20MM MG 151 cannons, with 200 rounds per gun. Two cannons were located in the starboard nose, ejecting their shell casing through ports under the nose. The other four cannons were mounted in an under fuselage pod mounted offset to port. Ammunition bins for these guns were located in the forward bomb bay, with the remaining bomb bay being used for fuel tanks. For defense, a single, upper, rear firing MG 131 machine gun, with 500 rounds of ammunition was fitted.

The canopy antenna mast was replaced by a retractable antenna mast installed on the fuselage behind the canopy. When retracted, it reduced drag and gave a clear field of fire for the rear machine gun. The under fuselage FuB 12 antenna was replaced by an FuG 25 whip antenna and an FuG 16/Y loop antenna. The trailing wire antenna mast was moved further to the rear and FuG 101 radio altimeter antennas were standardized under the outer port wing. At the time the Ju 88V-58 was built, FuG 212 radar was the front line standard, so this was mounted on the nose with the upper mast angled sharply upward to clear the nose mounted MG 151 cannons.

Although the Ju 88V-58 was built during the Spring of 1943, delays held up the flight tests and production until later that year. The test results confirmed an improvement in handling and maneuverability, and the Ju 88V-58 was accepted as the master pattern for the Ju 88G series (alternately being referred to as the Ju 88G V-1 or the Ju 88G-0) with the RLM ordering 700 Ju 88G series aircraft, before test flights had been completed.



The Ju 88V-58 had a deleted ventral gondola and carried four 20mm MG 151 cannons in an under fuselage pod, which was offset to port. Two additional MG 151s were carried in the starboard nose and the upper FuG 212 radar masts were angled upward to clear the guns. The V-58 (also known as the Ju 88G V-1) was the prototype for the Ju 88G-1 series. (Imperial War Museum)

Completed during early 1943 as a composite airframe, the Ju 88V-58 (G1+BW) featured the tail of the Ju 188 bomber, extra fuel and BMW 801D radial engines. The port trailing antenna was repositioned and a retractable radio antenna (which is extended) was installed behind the cockpit. (Imperial War Museum)

Ju 88G-1

The first production variant of the Ju 88G series, the Ju 88G-1, began leaving the production line during late 1943. Externally, the Ju 88G-1 was identical to the Ju 88V-58, with the FuG 212 radar being replaced by FuG 220 SN-2 radar. Early Ju 88G-1s retained the same armament as the Ju 88V-58; however, the two nose MG 151 cannons became unpopular because of their blinding muzzle flash and were soon deleted. Like the Ju 88R, early Ju 88G-1s utilized flame dampening exhaust shields. These soon were replaced by a factory-designed extension of the cowlings.

To improve control response, the ailerons were slightly enlarged and *Kuto-Nase* barrage balloon cable cutters were installed beneath a thin alloy covering on the wing leading edge. At the wing roots, optional leading edge fresh-air intakes were installed and extra fuel cells were added within the wing, increasing total internal fuel capacity to 847 gallons. There were also two horn style air intakes installed under the nacelles.

In the crew cabin, the updating of equipment led to a further increase in the size of the pilot's instrument panel. The radar control boxes could again be carried in either the forward or rear cockpit, and a small bucket type seat was installed next to the pilot for the radio operator/observer (some Ju 88C-6s and Ju 88Rs featured a bicycle type seat).

As production continued, a number of changes were made to the Ju 88G-1. One was the installation of smooth-cowled BMW 801 engines, indicating a possible use of earlier BMW 801A power plants, or a revision of the internal systems on the BMW 801D engines. A number of Ju 88G-1s were reportedly modified with GM-1 nitrous-oxide engine boost systems. These systems were supplied on a very limited basis as field conversion sets.



On some Ju 88G-1s, air vents were added to the port mid-fuselage side which became increasingly common on later Ju 88Gs. Although not usually installed, *Schräge Musik* cannons were sometimes field installed on a number of Ju 88G-1s, usually positioned further forward on the fuselage, just behind the canopy. Finally, Ju 88G-1s could be outfitted with one ETC 500 bomb rack under each inboard wing panel mainly for carrying drop tanks. During the last months of the war, however, some Ju 88Gs carried bomb loads for ground attack sorties.

The first Ju 88G-1s entered service during late 1943, with some reports recording Ju 88Gs in combat as early as December of that year. The Ju 88G-1 did not become available in substantial numbers, however, until early 1944, and by that time the RLM had increased its production order to some 1,800 machines.

On 13 July 1944, a Ju 88G-1 of 7/NJG 2 (coded 4R + UR) became the most well known Ju 88G in history when it landed at the emergency RAF air base at Woodbridge, Essex, after its crew accidentally flew a reverse compass heading after being on patrol over the North Sea. With this event — the second such incident in just over a year — the Luftwaf-

fe's latest night-fighter was captured by the Allies, examined and countermeasures were quickly developed against the FuG 220 and FuG 227 equipment.

Ju 88G-1s continued to serve with the *Nachtjagd* until the end of the war, sharing duties with the next major variant, the Ju 88G-6. The Ju 88G-2, G-3, G-4 and G-5 were designations given to developmental projects which did not go into production.

Ju 88G-1 *Flensburg*

When 4R + UR was captured it carried the FuG 227 *Flensburg* system, reportedly only a small number being in service at this time, and not all being carried by Ju 88s. With the discovery of the *Flensburg* homer by the Allies, *Monica* tail-warning radars were removed from RAF bombers, rendering the FuG 227 useless. As a result, it was not installed on other models of the Ju 88G series.

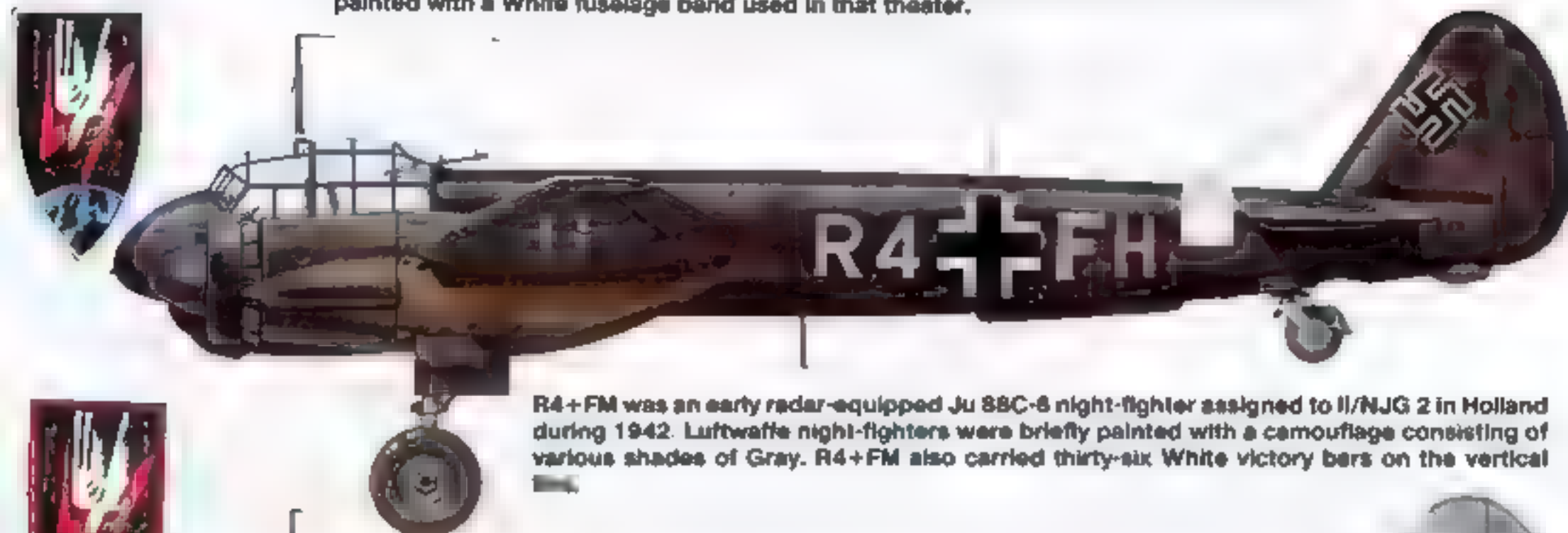
By the time the Ju 88G-1 was in full production, the cowling had been modified with a ring around the rear portion to cover the exhausts. The blackened rear nacelles were commonly caused by the engine exhaust. Ju 88G-1s entered combat in substantial numbers during the Spring of 1944. (Manfred Griehl)



For a brief period, early Ju 88G-1s were fitted with the same flame dampers as used on the Ju 88A. This camouflaged G-1 has been fitted with FuG 227 *Flensburg* aerials and whip antennas for an optional FuG 217 rear warning radar under the starboard wing. On Ju 88G-1s, FuG 217 antennas were usually mounted in this location. (Manfred Griehl)



An overall Black Ju 88C-4 of 1. Staffel, I Gruppe/NJG 2. After flying from bases in Holland, I/NJG 2 was transferred to the Mediterranean during late 1941, with some aircraft being painted with a White fuselage band used in that theater.



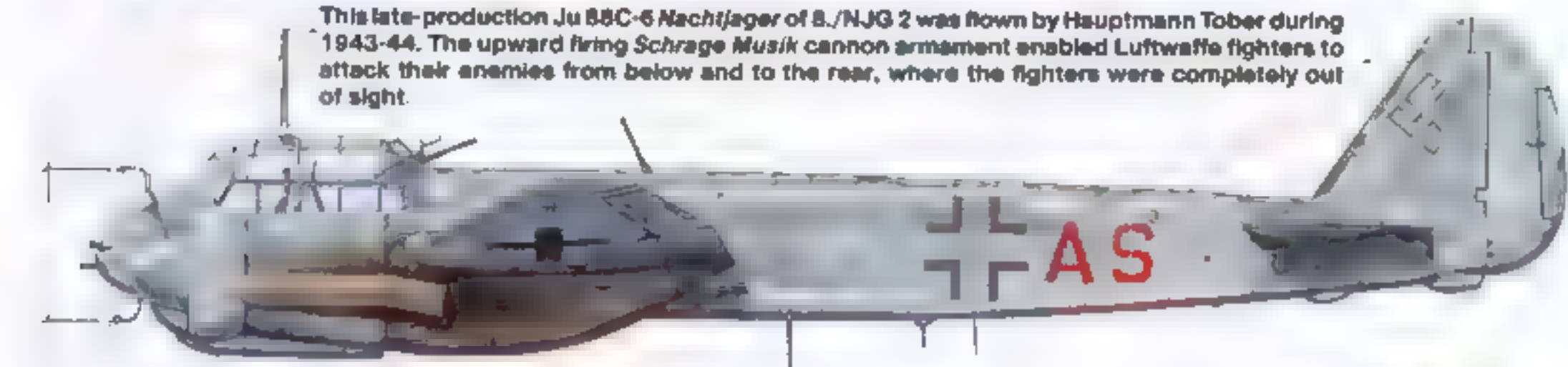
R4+FM was an early radar-equipped Ju 88C-8 night-fighter assigned to II/NJG 2 in Holland during 1942. Luftwaffe night-fighters were briefly painted with a camouflage consisting of various shades of Gray. R4+FM also carried thirty-six White victory bars on the vertical



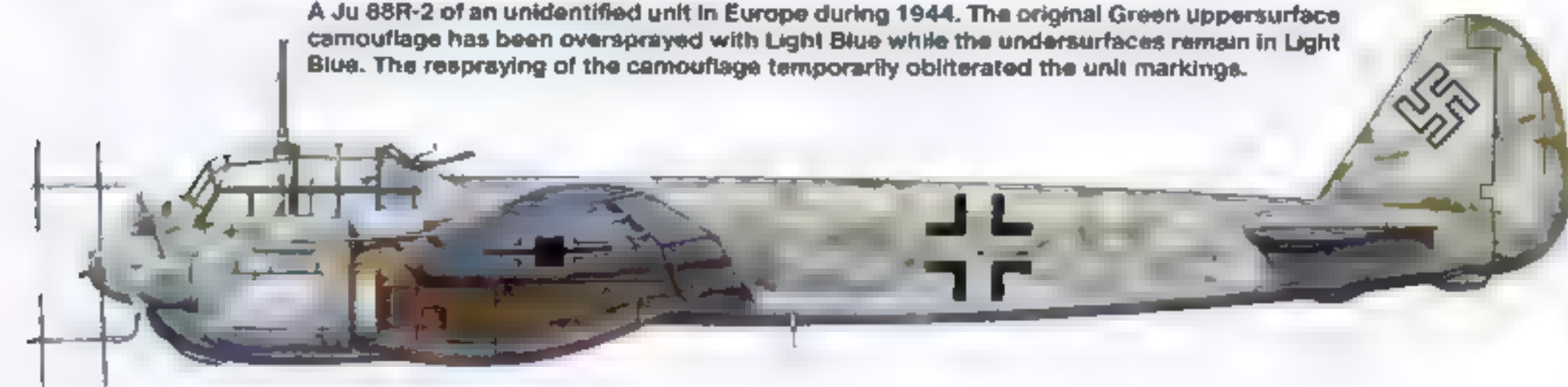
A Ju 88C-6 Zerstorer of 11. Staffel/Zerstorergruppe 26 in the Mediterranean theater during 1943. Black Green and Dark Green uppersurfaces over Light Blue undersurfaces was the standard finish for most Ju 88Cs operating in daylight.



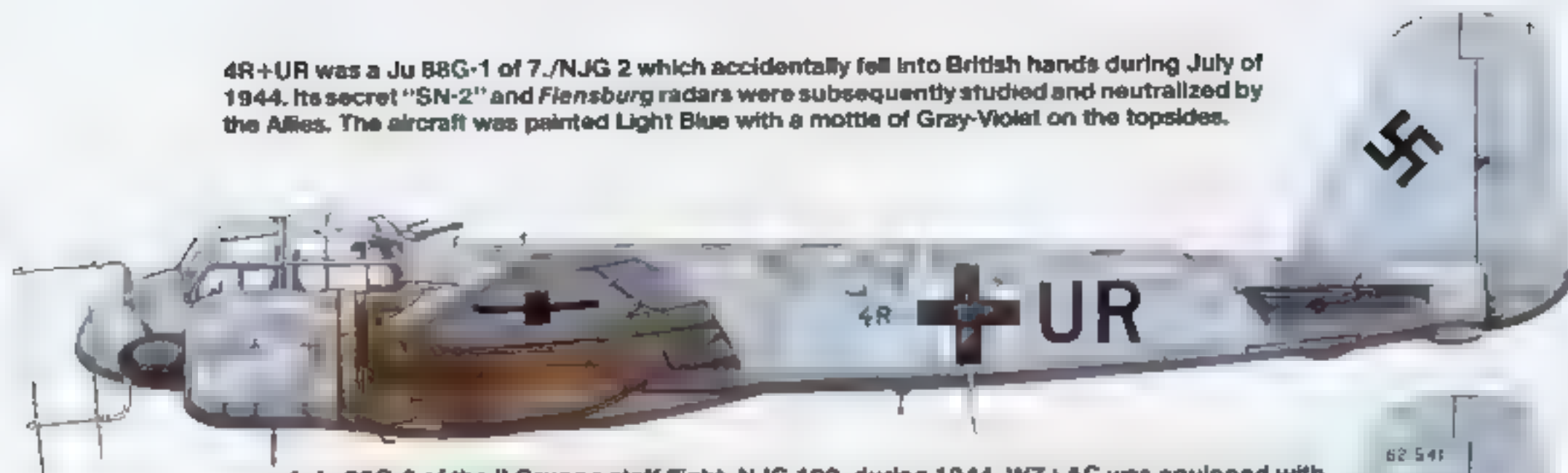
This late-production Ju 88C-6 *Nachtjager* of 8./NJG 2 was flown by Hauptmann Tober during 1943-44. The upward firing *Schrage Musik* cannon armament enabled Luftwaffe fighters to attack their enemies from below and to the rear, where the fighters were completely out of sight.



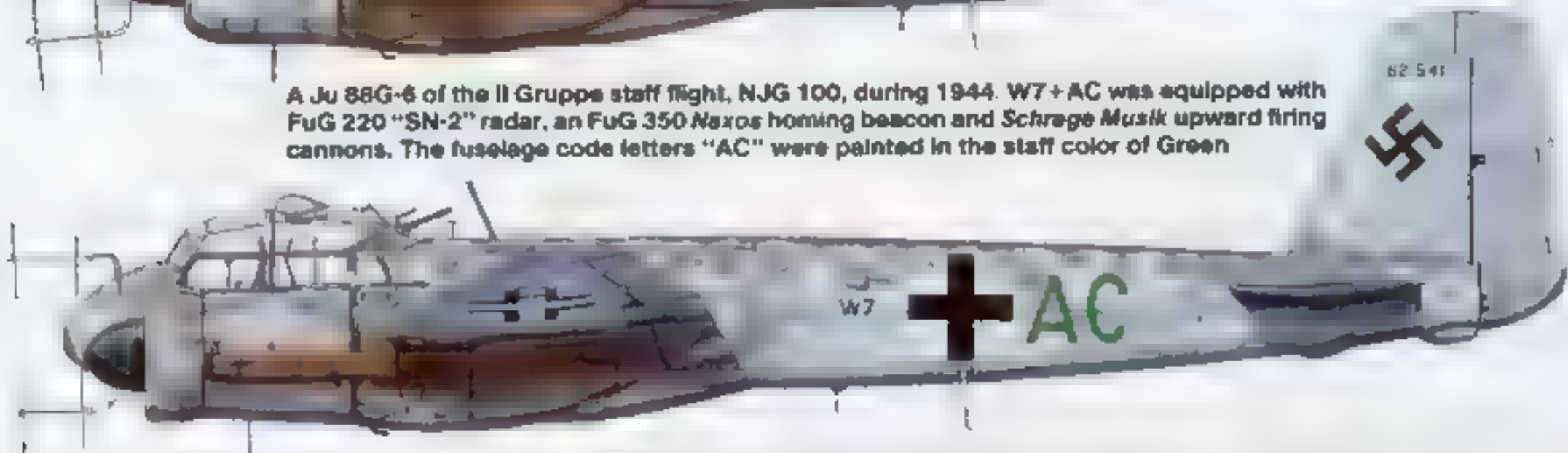
A Ju 88R-2 of an unidentified unit in Europe during 1944. The original Green uppersurface camouflage has been oversprayed with Light Blue while the undersurfaces remain in Light Blue. The respraying of the camouflage temporarily obliterated the unit markings.



4R+UR was a Ju 88G-1 of 7./NJG 2 which accidentally fell into British hands during July of 1944. Its secret "SN-2" and *Flensburg* radars were subsequently studied and neutralized by the Allies. The aircraft was painted Light Blue with a mottle of Gray-Violet on the topsides.



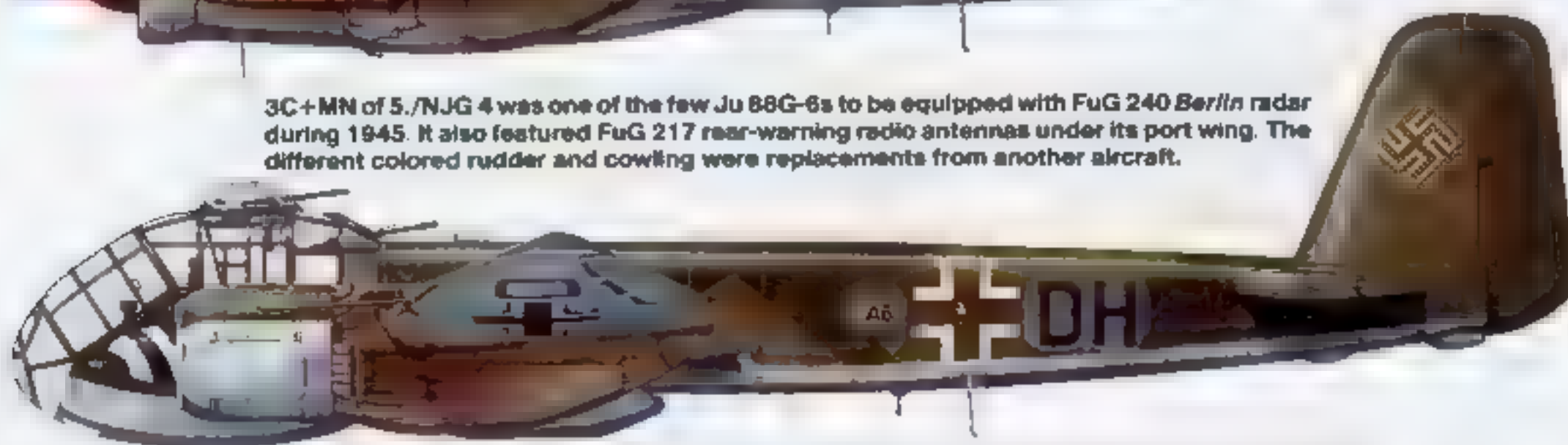
A Ju 88G-6 of the II Gruppe staff flight, NJG 100, during 1944. W7+AC was equipped with FuG 220 "SN-2" radar, an FuG 350 *Naxos* homing beacon and *Schräge Musik* upward firing cannons. The fuselage code letters "AC" were painted in the staff color of Green.



This Ju 88G-6, C9+AR belonged to 7./NJG 5 and was equipped with the FuG 218 V/R *Neptun* radar. Its crew flew to Switzerland during April of 1945 where the aircraft was impounded. The upper surfaces were heavily oversprayed with Green 81 and 82.



3C+MN of 5./NJG 4 was one of the few Ju 88G-6s to be equipped with FuG 240 *Berlin* radar during 1945. It also featured FuG 217 rear-warning radio antennas under its port wing. The different colored rudder and cowling were replacements from another aircraft.

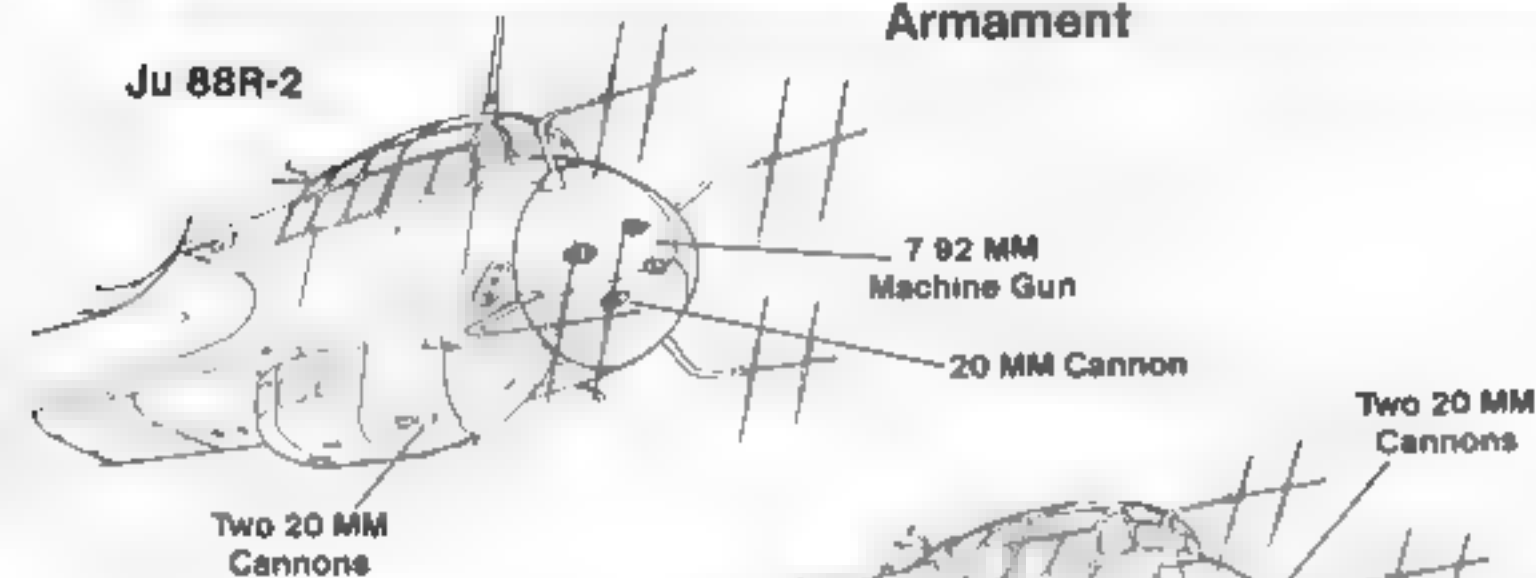


This Ju 188F was assigned to 1.(F)/120 during 1944. The Black Green, Dark Green and Light Blue (65) camouflage was the standard factory color scheme for Ju 188s. The code letters on this aircraft have been changed with the earlier codes being overpainted in Gray.

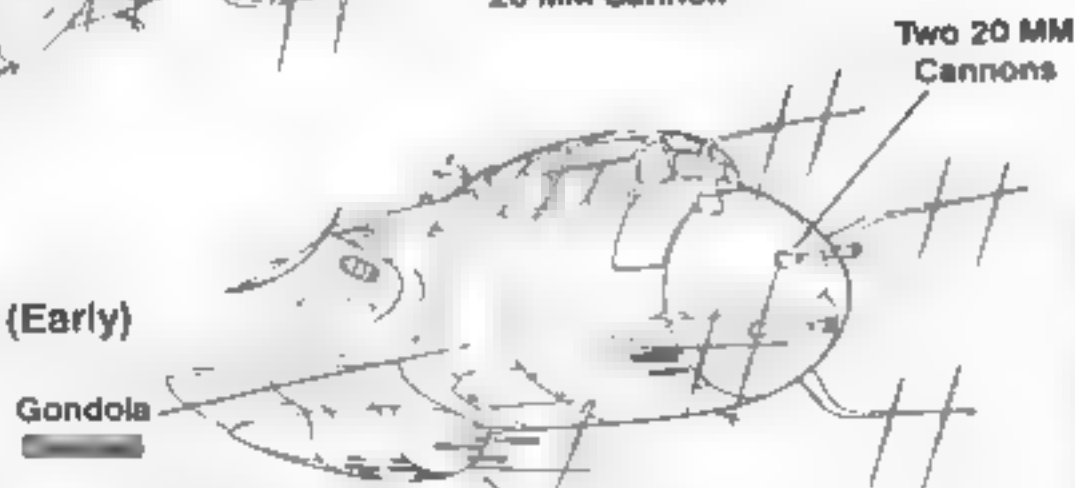


Armament

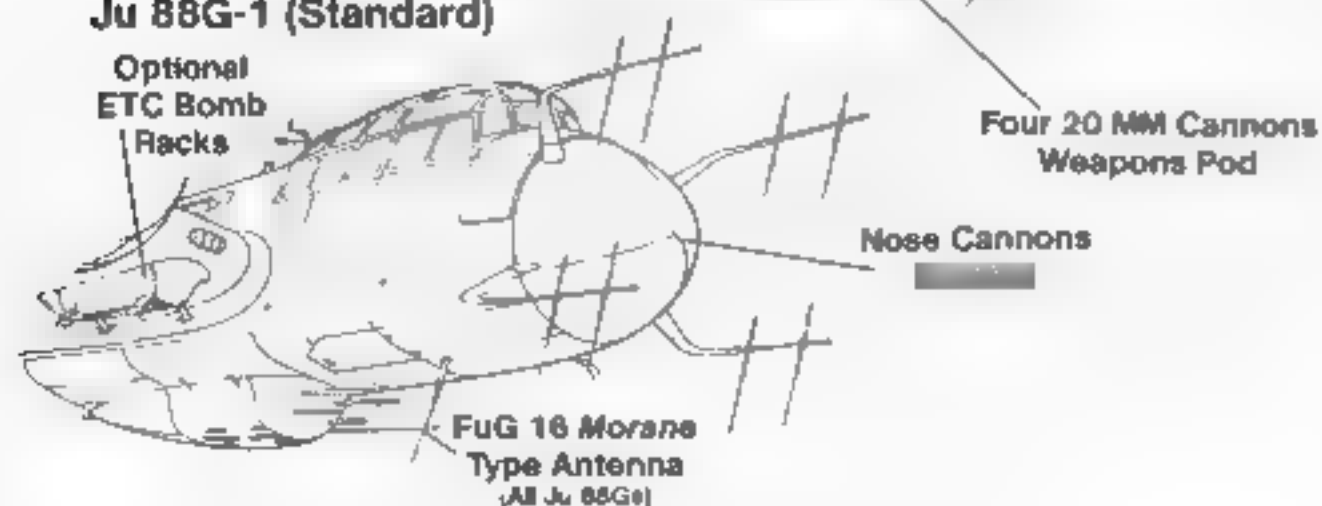
Ju 88R-2



Ju 88G-1 (Early)

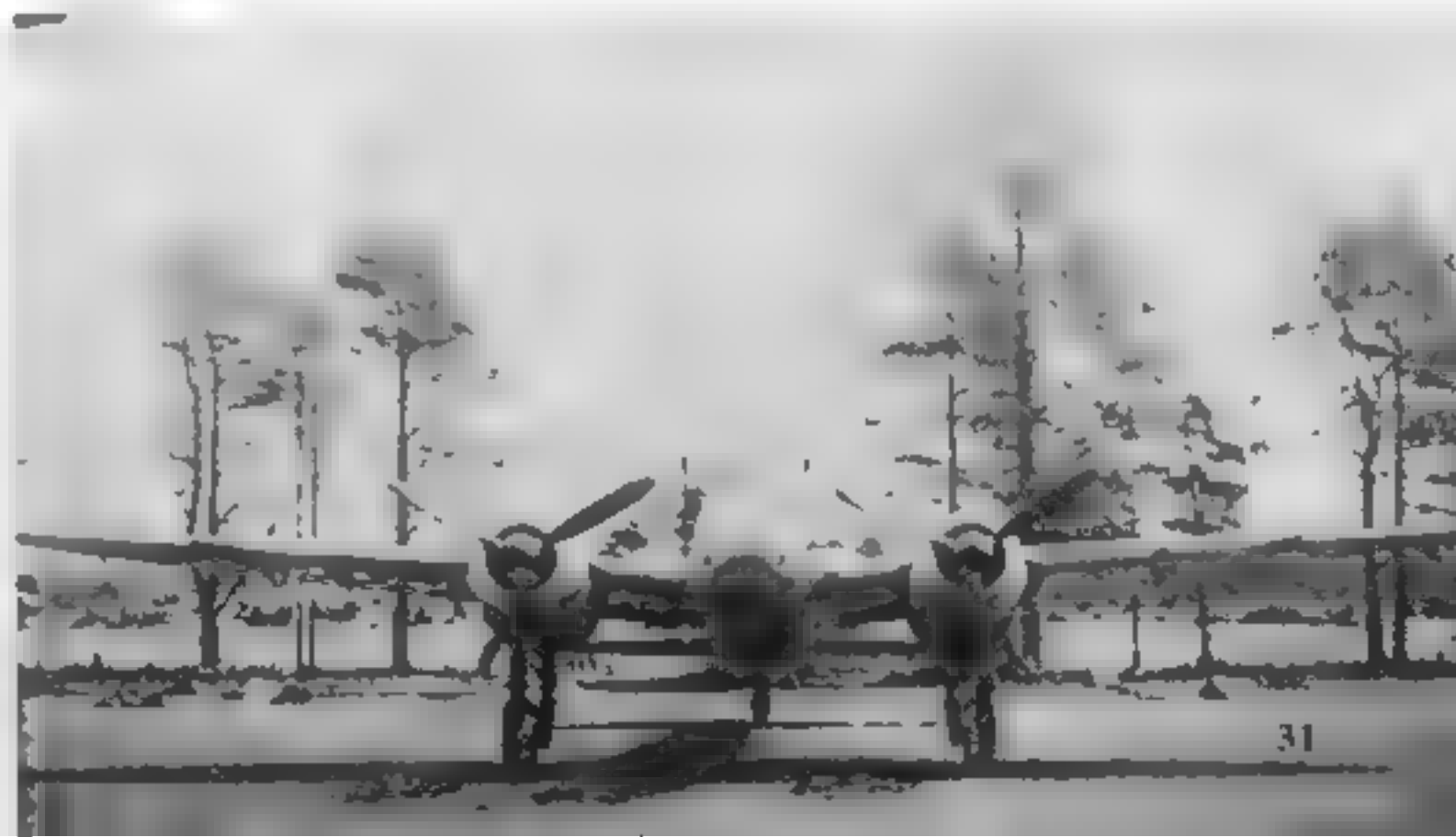


Ju 88G-1 (Standard)



The best known of all Ju 88Gs was 4R+UR of 7./NJG 2, which accidentally landed on an RAF airfield on 23 July 1944. This capture revealed the latest Luftwaffe radar technology to the Allies. By this time the camouflage of Light Blue with a Gray-Violet mottle was being applied at the factory. The canopy frame was Gray-Violet, the propellers and spinners were Black Green, and the fuselage codes were Black. (Imperial War Museum)

The two MG 151 nose cannons carried on the Ju 88V-58 were soon deleted on the Ju 88G-1 because of their blinding muzzle flash. This restricted armament to the belly weapons pod cannons. 4R+UR was equipped with the FuG 227 Flensburg wing antennas and FuG 220 nose antennas.



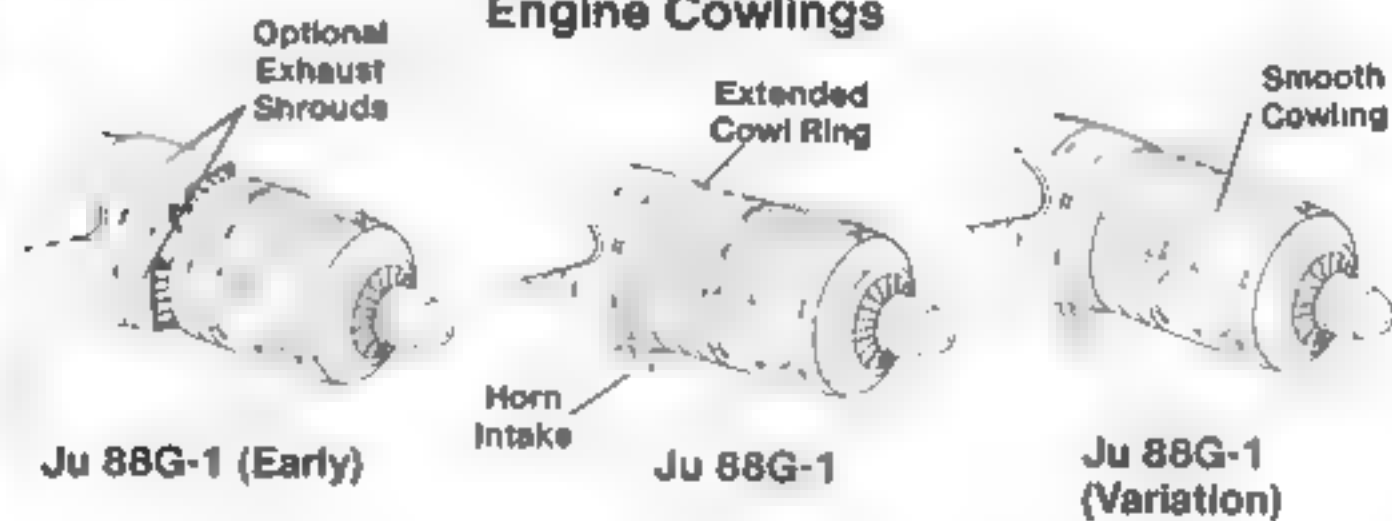


This Ju 88G-1, carries a streaky application of the Gray-Violet mottle on the aircraft upper-surfaces. Antenna elements on Ju 88s were usually finished in Dark Gray, but some were seen in Black, Gray-Violet and Light Blue. The FuG 220 SN-2 antenna array was angled slightly downward from the aircraft centerline (about five degrees). (Manfred Griehl)

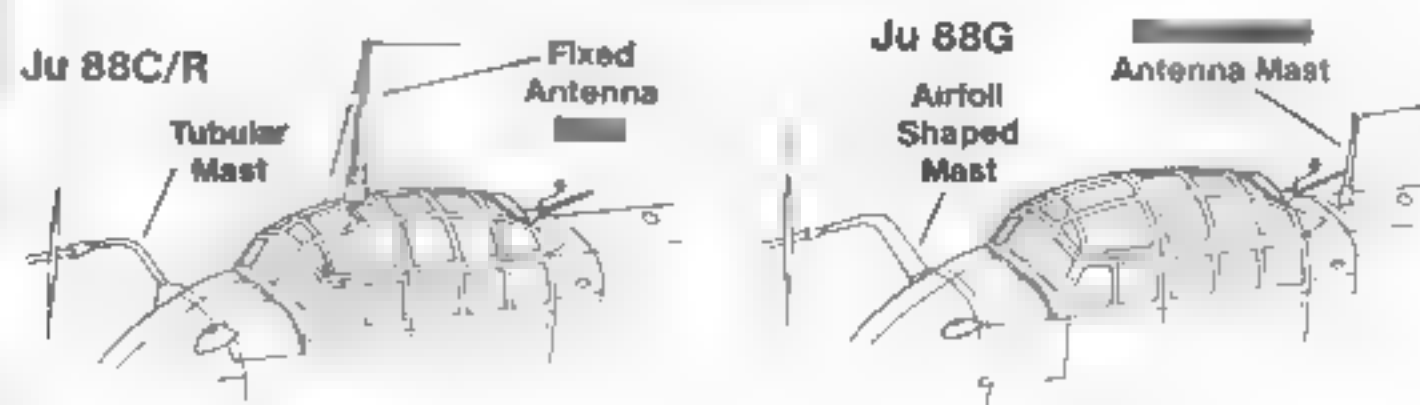


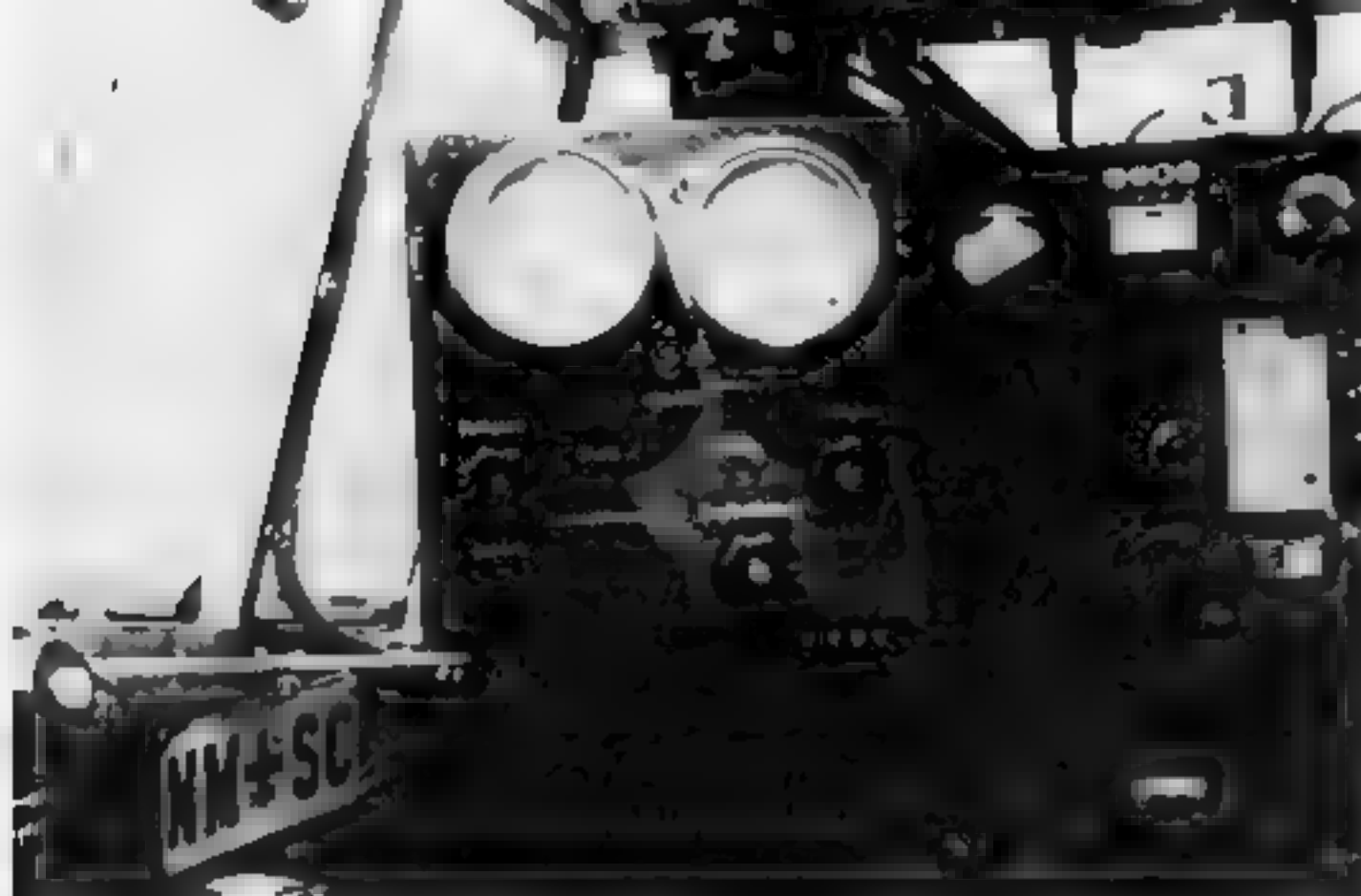
The FuG 220 radar was standard on the Ju 88G-1, although fitted with broader airfoil shaped main masts. This Ju 88G-1 featured a window in the crew hatch. Below the window was the shell casings ejection port for the upper rear firing MG 131 machine gun. (Manfred Griehl)

Engine Cowlings



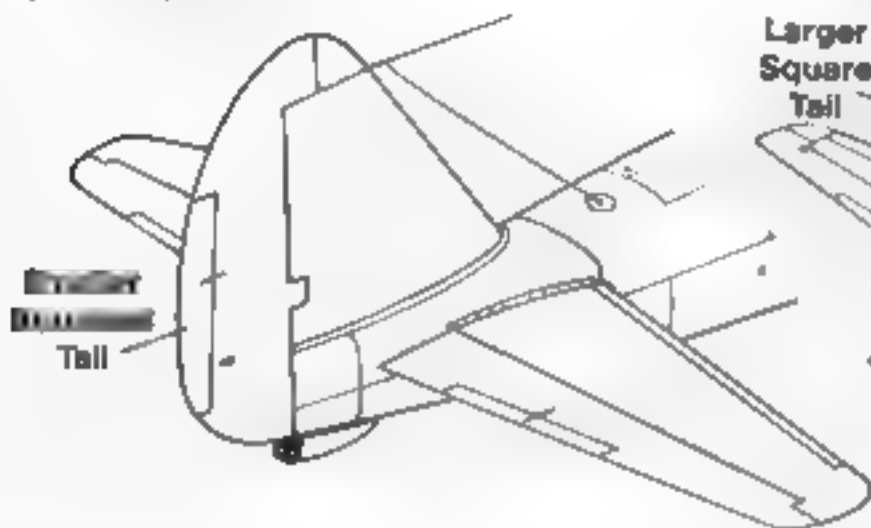
Antenna Mast



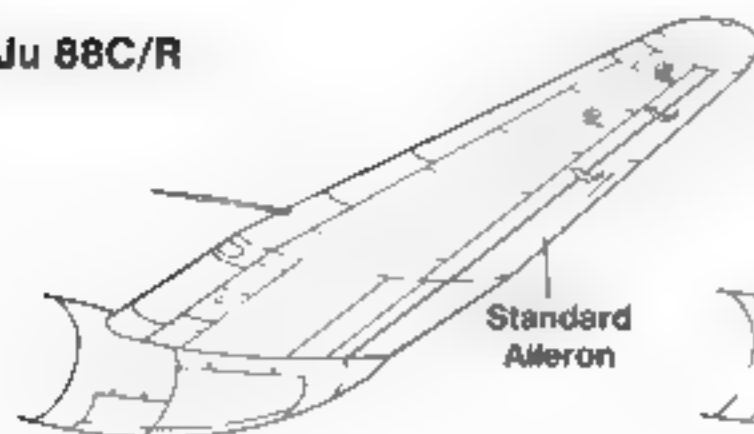


The indicator boxes for the FuG 220 SN-2 radar were positioned either at the rear of the cockpit or at the starboard front. The radar operator detected contact with enemy aircraft by observing changes in the bluish light on the two cathode ray tubes. A padded shroud could be attached over the tubes to block outside light. (Manfred Griehl)

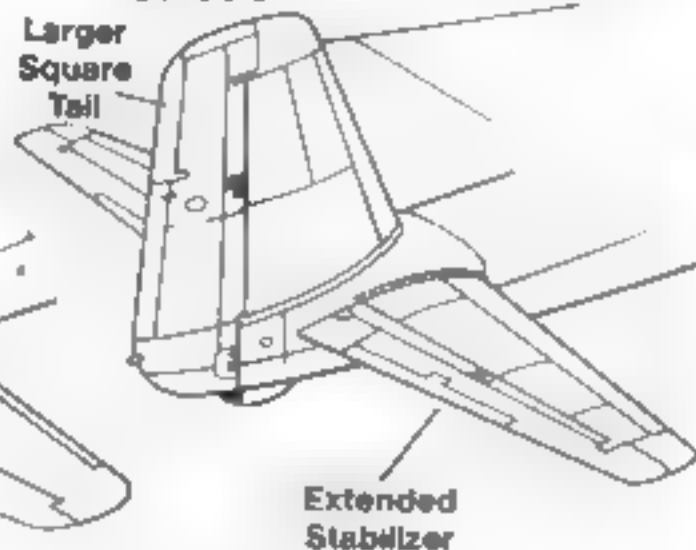
Ju 88C/R



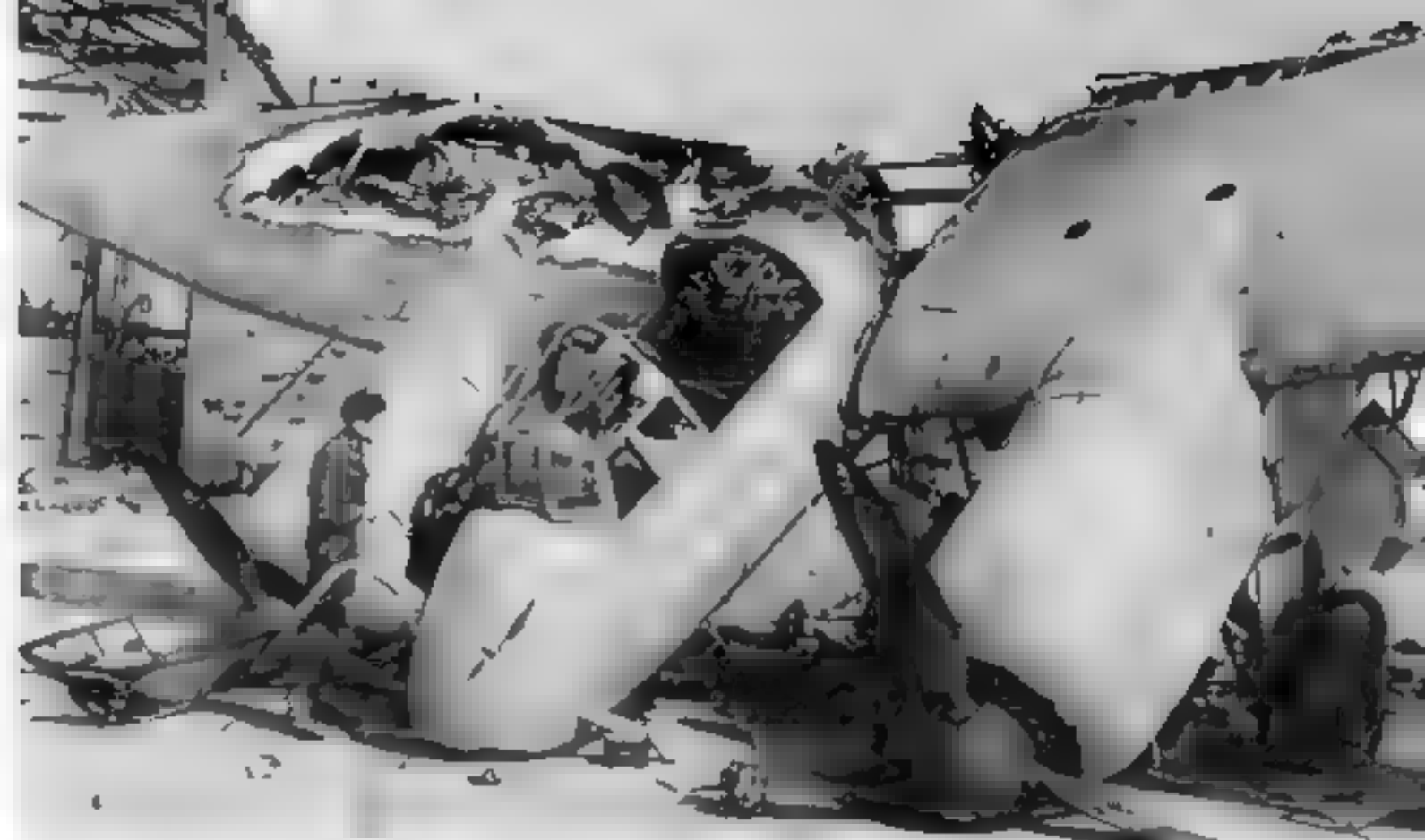
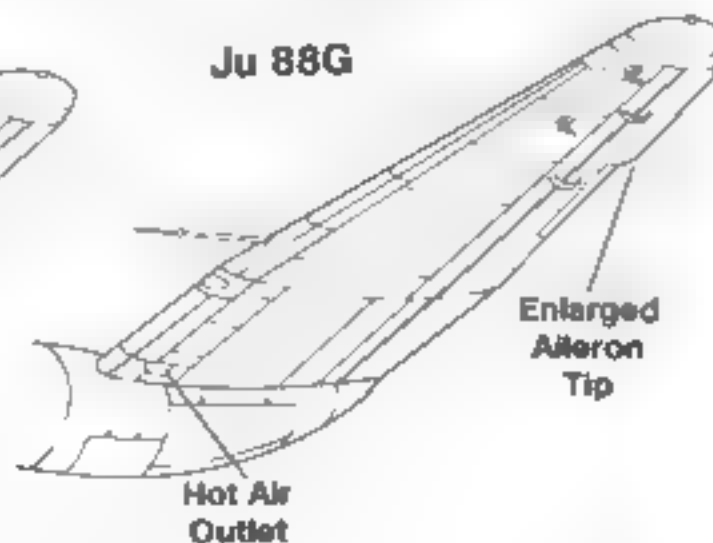
Ju 88C/R



Ju 88G



Ju 88G



A number of Ju 88G-1s were manufactured with smooth-cowled BMW 801 radial engines, possibly indicating internal modifications to the power plants. This burned-out Ju 88G-1 featured a fully armored windshield, wing root air intakes and an unusual camouflage scheme — a segmented mixture of speckle, squiggled and cross-hatched patterns (USAF)

This Ju 88G-1 has T antennas under the outer wing panels for the FuG 101 radio altimeter and enlarged ailerons (which were a characteristic of the Ju 88G series). Horn type air intakes are visible under the engine nacelle.



Ju 88G-6

To increase engine power on the Ju 88Gs, Junkers re-engined the aircraft with two 1,750 hp Junkers Jumo 213A inline liquid cooled engines under the designation Ju 88G-6. This variant entered production during mid-1944. The Ju 88G-6 differed from earlier Jumo powered Ju 88s in that the cowlings featured a starboard supercharger air intake, a revised radiator face, additional cooling flaps and a new system of access panels for servicing the engines. The Jumo 213s drove VS-111 paddle blade propellers, and optional flame dampening tubes could be attached over the revised exhaust stacks. With these power plants, the Ju 88G-6 could achieve a speed of 360 mph (25 mph faster than a Ju 88G-1) and attain a service ceiling of 31,515 feet. The aircraft had a combat weight of 27,337 pounds, approximately 660 pounds heavier than the Ju 88G-1.

Like the Ju 88G-1, the Ju 88G-6 could be equipped with one ETC 500 bomb rack beneath each inboard wing panel for drop tanks or bombs. The two port side mid-fuselage air vents (sometimes installed on the Ju 88G-1) were standardized on the Ju 88G-6, and the wing root leading edge air intakes were deleted. An additional equipment hatch was added under the rear fuselage, with the FuG 16ZY loop aerial being repositioned slightly more forward. Whip antennas for the optional FuG 217 tail-warning radar were usually mounted under the port outer wing (starboard wing on the Ju 88G-1).

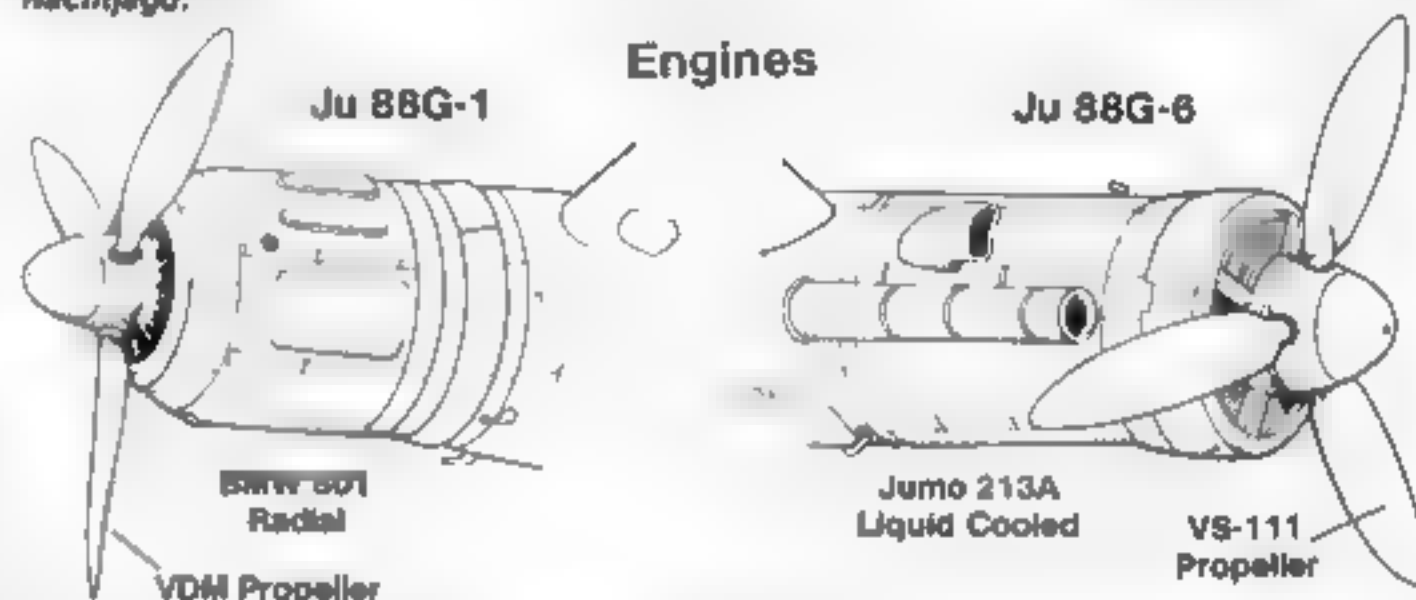
Frequently, Ju 88G-6s carried upper fuselage MG 151 20MM *Schräge Musik* cannons in several different arrangements. Late production Ju 88G-6s had these weapons installed at the factory just forward of the LZ 6 antenna cover, offset to starboard. Ammunition for the underside four cannon weapons pod was increased to 500 rounds per gun, and the rear firing MG 131 machine gun position was retained.

At the time that the Ju 88G-6 entered combat, the FuG 220 SN-2 was the current airborne radar, but due to Allied countermeasures, Ju 88G-6s were progressively re-equipped with later variants of FuG 220, as well as FuG 218 *Neptune*, FuG 350 *Naxos* and finally the FuG 240 *Berlin* (during the final weeks of the war). Many Ju 88Gs captured by the Allies at the end of the war were equipped with a mixture of radar types.

By late 1944, the Ju 88G-6 was sharing combat duties alongside Ju 88G-1s and surviving Ju 88C-6s and Ju 88R-2s. The Ju 88G-6's contribution to night defense, however, had little impact on the declining war situation. The fact that Germany was totally on the defensive was evidenced by the complete turnover of bomber production facilities to defensive day and night fighter production. During 1944, only 716 Ju 88 bomber and reconnaissance variants were manufactured, as opposed to 2,518 fighters, mostly Ju 88Gs. During the last two years of the war, the Ju 88 fighter had evolved from its early "low priority" status to equipping NJG 1, 2, 3, 4, 5, 6, 7, 100, 101, 102, 200 and other various specialized *Nachtjagdgruppen*.



The Ju 88G-6 entered production during mid-1944 and was basically a Ju-88G-1 equipped with Junkers Jumo 213A in-line liquid cooled engines driving VS-111 propellers. Some 2,518 night-fighters were produced in 1944, giving some idea of the Ju 88's importance to the *Nachtjagd*.



This Ju 88 G-6 (W7+LK) was assigned to 2./NJG 100, which served mainly on the Eastern Front. Since Ju 88G-6s utilized alternate frequencies of FuG 220 SN-2 radars, they were usually equipped with angled dipole antennas. The exhausts of the Jumo 213A engines were commonly shrouded with flame dampers.





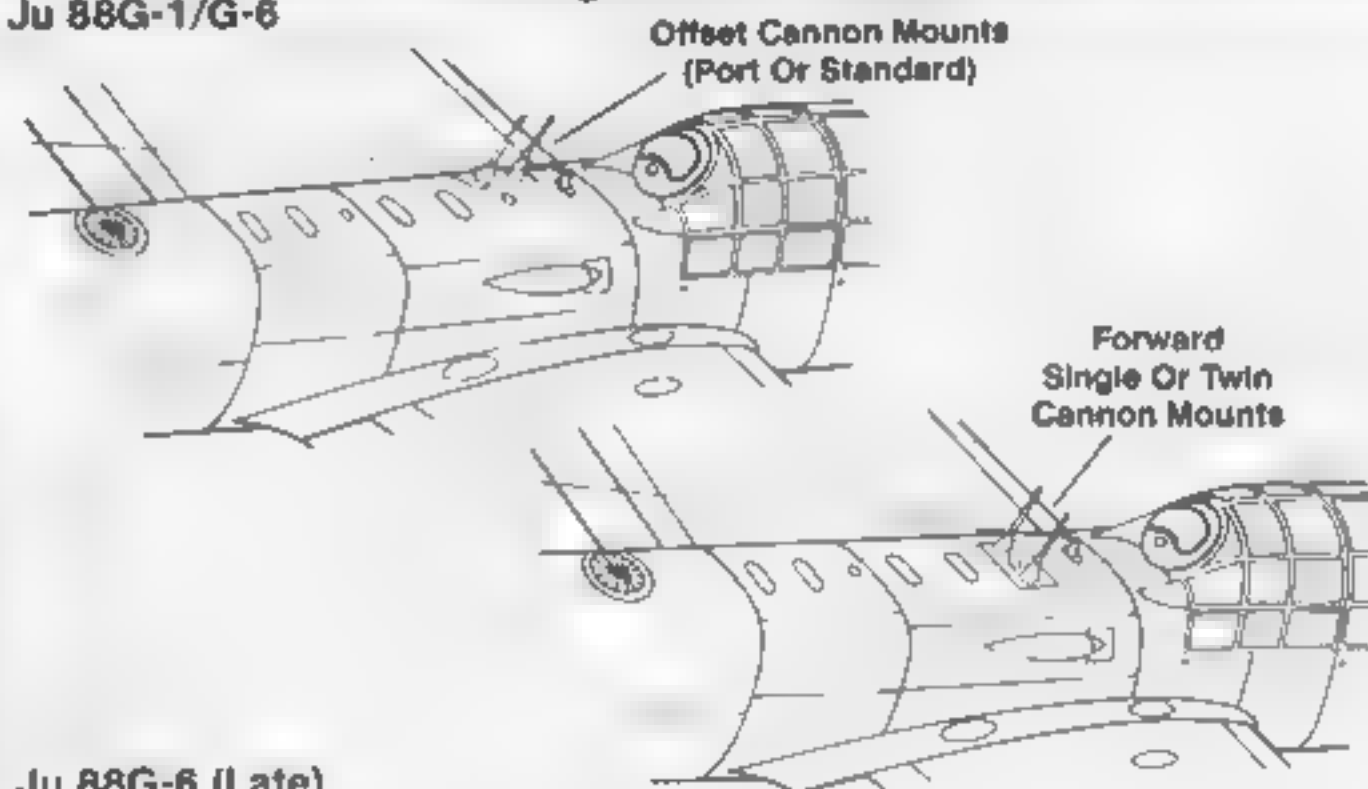
Schräge Musik upward-firing cannons were employed more frequently on the Ju 88G-6 than any previous Ju 88 variant. Several configurations were used, with late G-6s featuring a standard mounting of two side-by-side MG 151 cannons in the rear fuselage. Visible just below the rudder is the main mast for an FuG 220 tall warning antenna. (M. Ter Linden)

W7 + AC was assigned to the II Gruppe staff flight of NJG 100. The aircraft has a dual side-by-side *Schräge Musik* cannon installation just behind the cockpit canopy — one of several variations of this anti-bomber installation. The guns had an ammunition load of up to 500 round per gun. (Wolfgang Tamme)

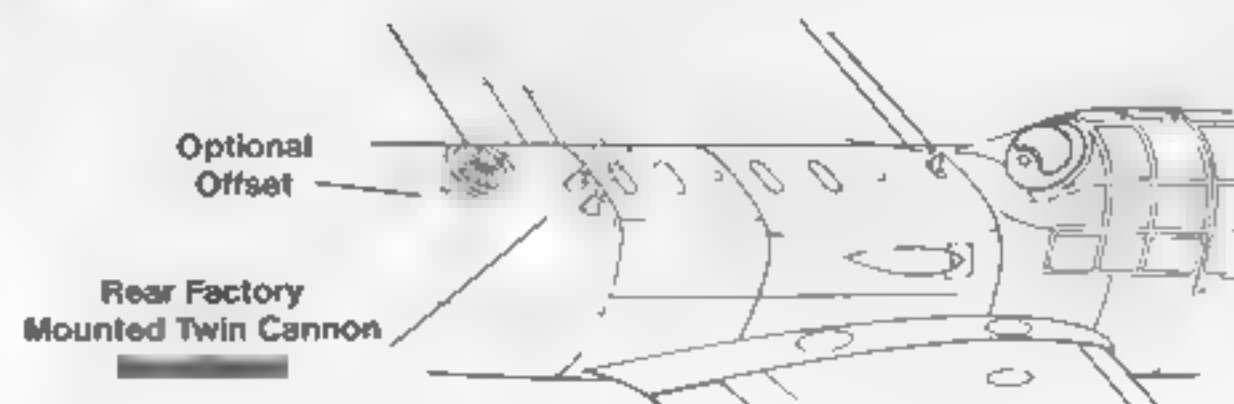


Schräge Musik Installations

Ju 88G-1/G-6



Ju 88G-6 (Late)



Night Operations 1944-45

Although the *Nachtjagd* had its greatest success during the early months of 1944, the RAF continued to mass night bomber formations that were able to penetrate Luftwaffe night defenses and reach their targets, meanwhile, U.S. Army Air Force bombers had taxed day Luftwaffe units to the point that night-fighter pilots were being ordered to fly day sorties. Additionally, both the RAF and the USAAF were using long range fighter escorts which took a heavy toll of defending Luftwaffe fighters. At night, the DeHavilland Mosquito night-fighter became a formidable foe for German night-fighter pilots.

With the capture of Ju 88G-1 4R + UR, Germany suffered an irreversible set back in its technological competition with the Allies. The "radar war" continued, however, until the Spring of 1945, with the Allies uncovering new methods for jamming German radars. As the Allied armies moved through Europe after the invasion of France in June of 1944, the Luftwaffe ground radar network was fragmented. Additionally, a lack of fuel and a progressive organizational collapse further weakened the *Nachtjagd*.

During the closing months of the war, Ju 88Gs participated in *Unternehmen Bodenplatte* (Operation Baseplate) the daylight attacks against forward Allied airfields, the Ju 88s were used as strafers and pathfinders for single seat fighter-bombers. On 1 January 1945, intruder sorties over RAF airfields in England were briefly and unsuccessfully resumed that March and further nocturnal ground-attack missions against frontline Allied troops were ordered, at times using bomb carrying Ju 88Gs.

By 1 April 1945, there were roughly 350 Ju 88 night-fighters left out of the total *Nachtjagd* force of 668 aircraft. By 8 May 1945, what was left of the Ju 88 force could be found abandoned, stripped, demolished and sometimes "booby trapped" with explosives, on airfields throughout Germany.

FuG 220 SN-2 Variations

With the capture of Ju 88G-1 4R + UR in July of 1944, an intact 91 MHz SN-2 radar set fell into Allied hands. This event meant that the radar, which equipped the Ju 88G-6, Ju 88R-2 and Ju 88G-1, was quickly rendered useless by Allied countermeasures. Fortunately for the Germans, alternate radars had been under development since early that year, which allowed for a total frequency shift into two major groups: (1) Frequencies I, II and III (64-82 MHz) and (2) Frequencies IV, V, VI and VII (91-116 MHz).

The final production radar was the Model D (sometimes referred to as SN-2d) which offered a maximum range of just over six miles, a short-range switchover capability and additional tail-warning capability. Frequency IV radars were characterized by vertical dipole antennas, while the remaining frequency sets were identified by dipoles which were mounted at a 45 degree angle.

With the capture of 4R + UR, frequencies IV thru VI became jammable, which meant that the angled antennas of the surviving frequencies became the late war standard installation.

The late SN-2 offered tail-warning capability with two variations of tail antennas. One was a mast carried below the rudder, partially anchored to the fuel-jettison housing. This arrangement required the removal of the Ju 88G's lower rudder section. A later arrangement allowed for installation of the dipoles on the vertical fin, eliminating the tail mast.

Streamlining was also attempted with the *Morgenstern* (Morningstar) nose antenna, which consisted of a single center main mast with the dipoles attached as "X-elements." Optionally, the *Morgenstern* antenna could be covered with a plywood nose cone with a plexiglass dome tip.

FuG 350z *Naxos*

The FuG 350, like the FuG 227 *Flensburg*, was a passive homing device designed to detect the emissions from British H2S bombing radars. Originally developed during the Summer of 1943, production of the *Naxos* commenced in early 1944 and the device entered service at about the same time as the *Flensburg*. The *Naxos* was identified by a small dome on the port upper canopy framing, although on Ju 88G-6s fitted with the FuG 220 *Morgenstern* nose cone, the *Naxos* elements could be housed in the rear of the wooden nose cone. Offering a contact range of just over 30 miles, the FuG 350 *Naxos* remained in use until the war ended.

FuG 218 V/R *Neptune*

After the neutralization of the FuG 220 SN-2 radar by Allied jamming, the next major development was the FuG 218 *Neptune* which entered service at the end of 1944. FuG 218 was a variable frequency radar offering six settings between 158-187 MHz. It had a maximum range of three miles and a minimum range of 120-131 yards. The antenna arrangement consisted of a single centerline main mast, with a large X-frame supporting eight vertical dipole elements. This configuration was generally referred to as *Hirschgeweih* (Stag's Antlers), although this nickname has also been used in reference to the large FuG 220 SN-2 antenna arrangement. For tail warning, the FuG 218 had a small curved mast on the vertical fin tip which supported two horizontal elements.

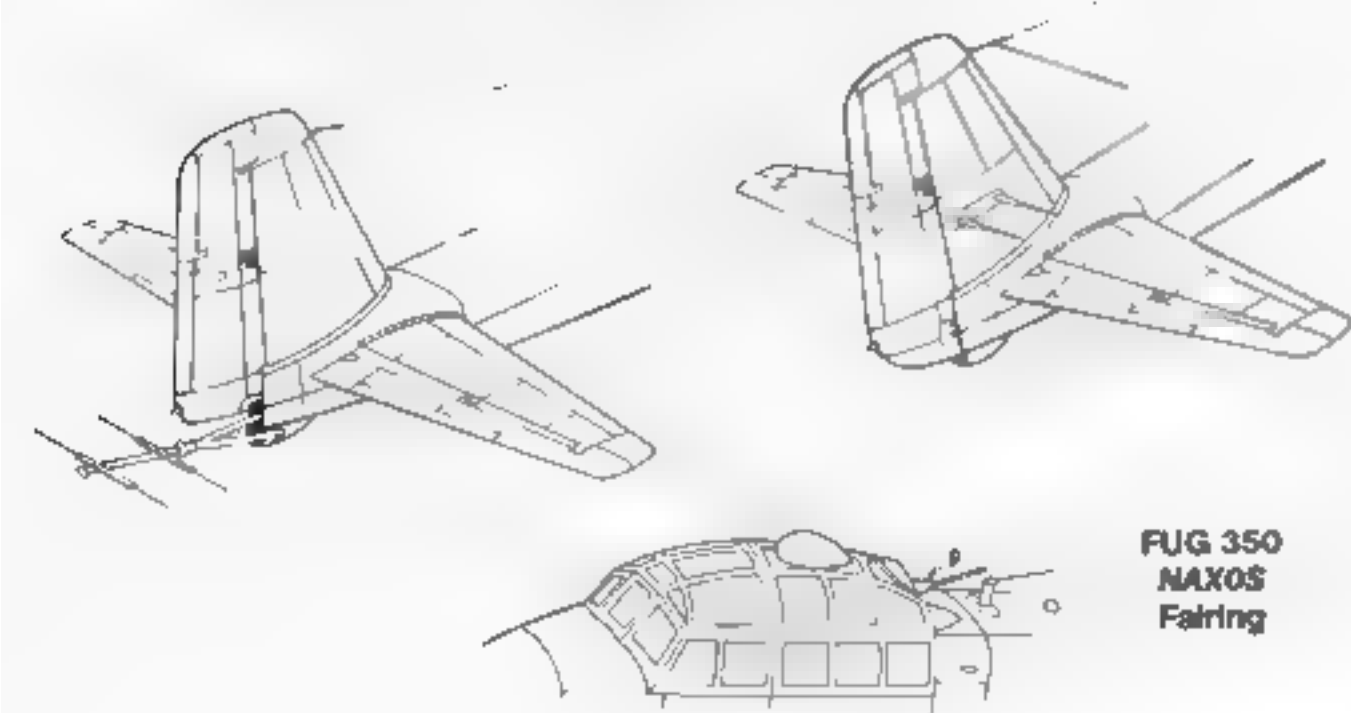
One secret device which largely escaped Allied jamming was the FuG 350z *Naxos* passive homing radio, which located emissions from British H2S bombing radars. The *Naxos* was characterized by a teardrop antenna cover above the port canopy. (Hans Redemann)





Later versions of the FuG 220 SN-2 had a tail warning function. The main antenna mast was partially anchored to the fuel jettison housing and required the removal of the lower rudder section. A simplified version had the dipoles installed on the sides of the vertical fin. The antenna had Red and White stripes painted on it for ground crew safety (S.M. Coates)

FuG 220 Tail Warning Antennas



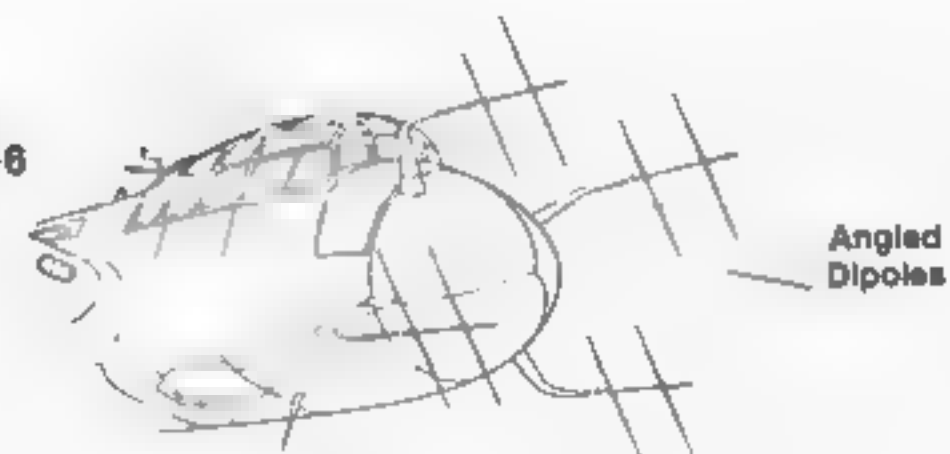
FUG 350
NAXOS
Fairing

FuG 220 SN-2 Radar Development

Ju 88G-1



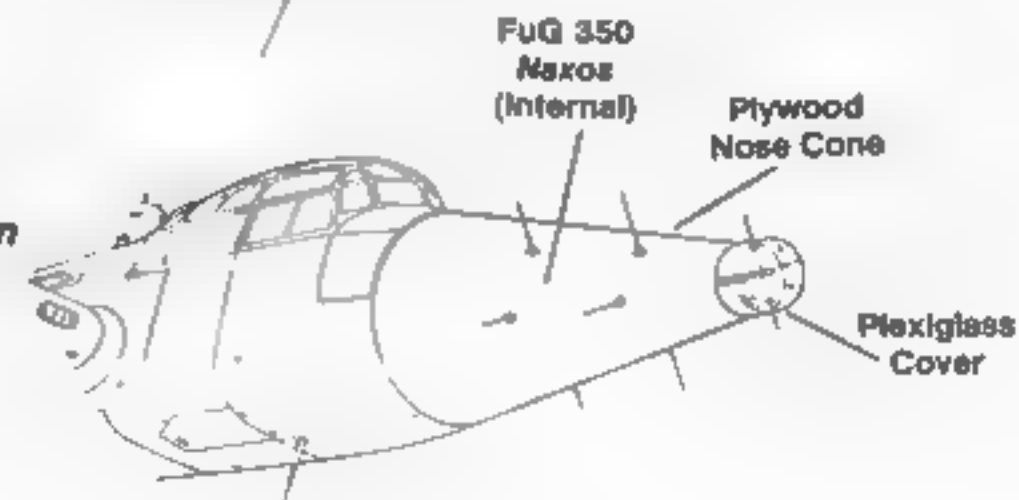
Ju 88G-6



Morgenstern



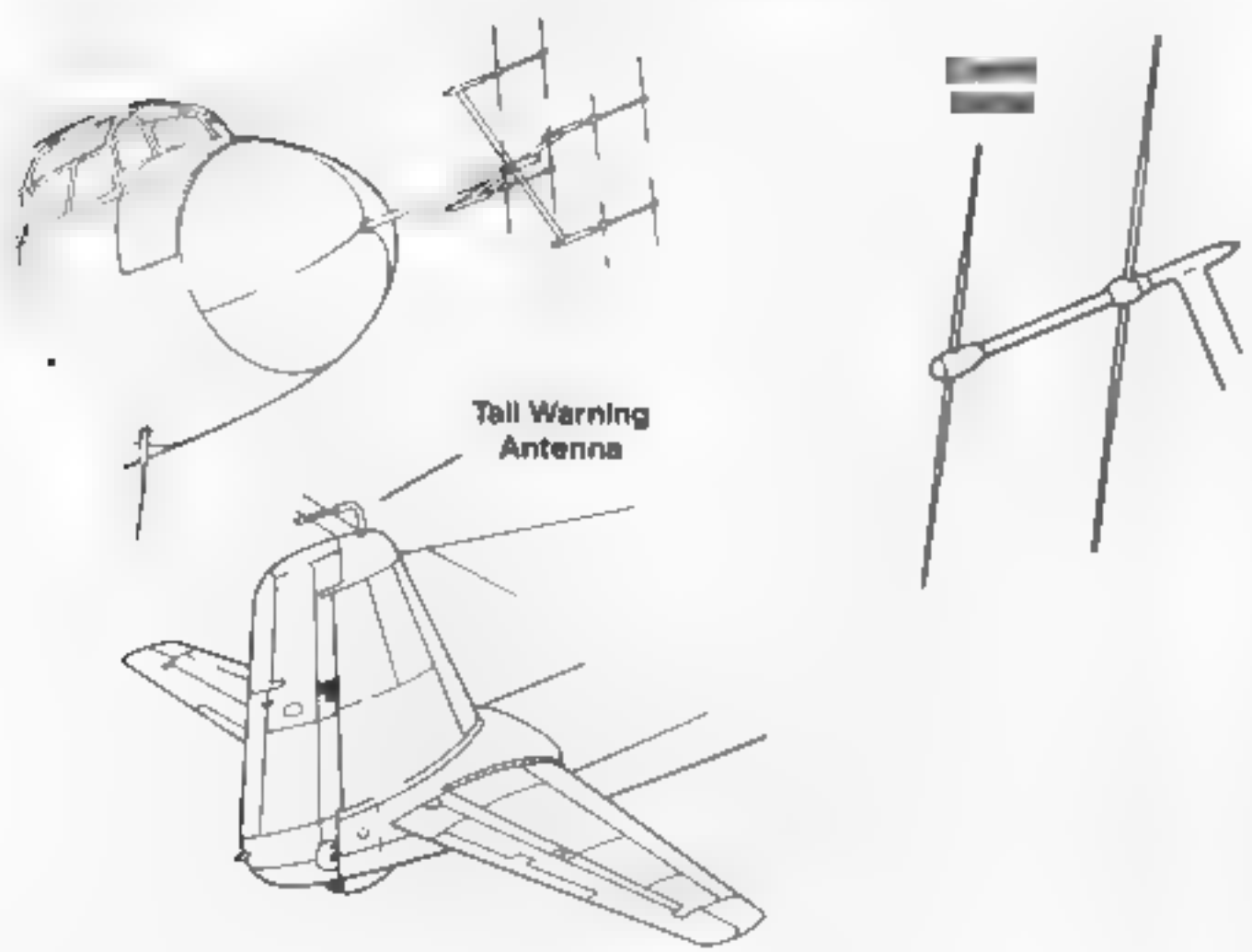
Covered
Morgenstern



FuG 240 *Berlin N-1a*

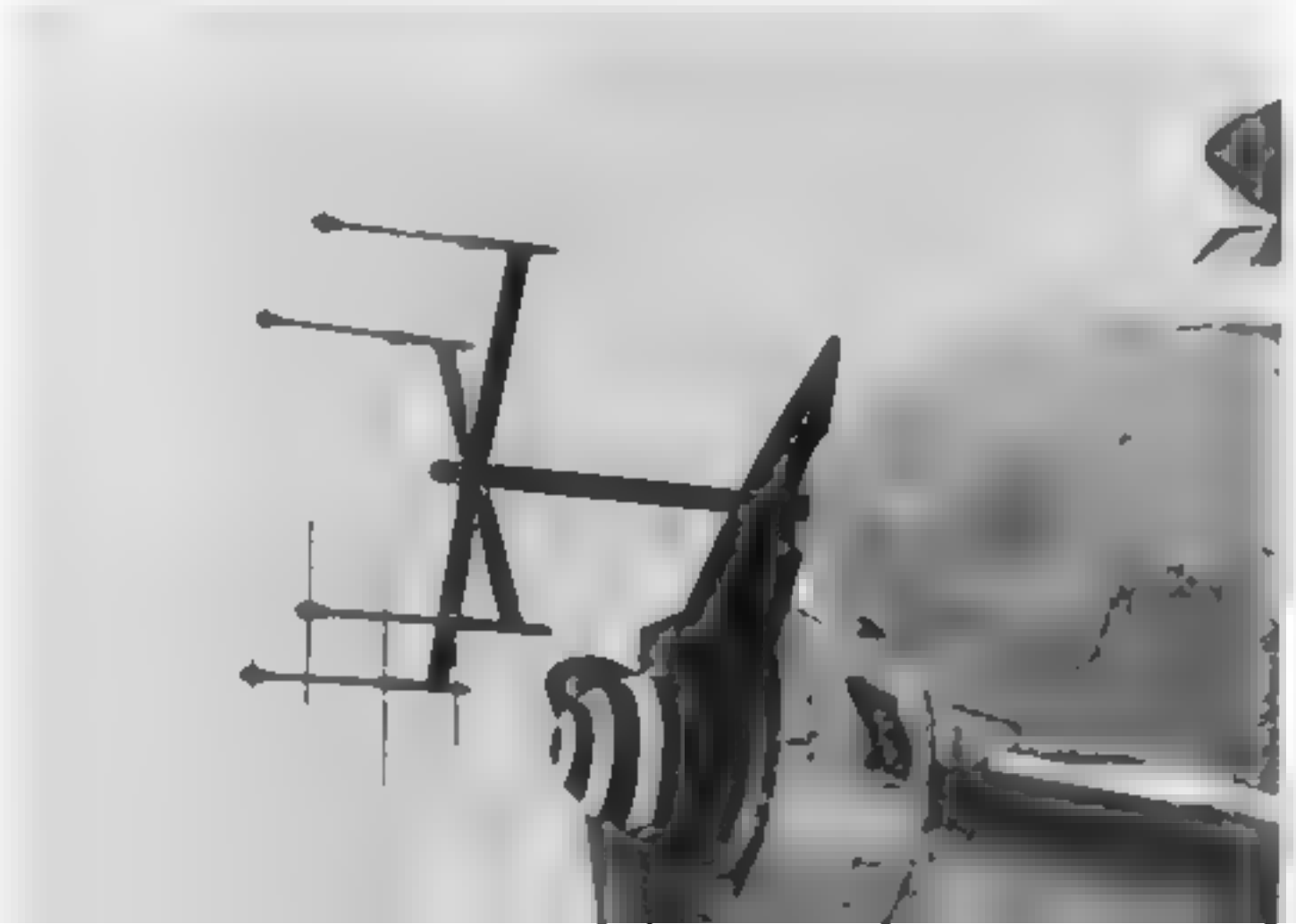
FuG 240 *Berlin* radar was introduced during the last month of the war with only some twenty-five to thirty sets being issued to service units. Offering contact ranges comparable to FuG 218 *Neptune*, the FuG 240 weighed just under 400 pounds and featured a technologically advanced nose-mounted dish antenna instead of the usual maze of dipole elements. The dish antenna was protected by a blunt wooden nose cap which provided the cleanest possible configuration of the Ju 88 G-6.

FuG 218 *Neptune* Antennas



The FuG 218 *Neptune* radar entered service during the final months of the war. This Ju 88G-6 of 7 /NJG 5 (coded C9 + AR), was flown to Switzerland on 30 April 1945, and was later placed on public display. It was equipped with FuG 218 nose and tail-warning antennas. It was heavily resprayed with Dark Green upper surfaces. (Hans-Hein Stapfer)

The forward antennas of the FuG 218 were similar to the earlier FuG 220 SN-2, but was smaller and mounted on a single center line main mast. The small bulb under the nose is a White navigation light. (Manfred Griehl)



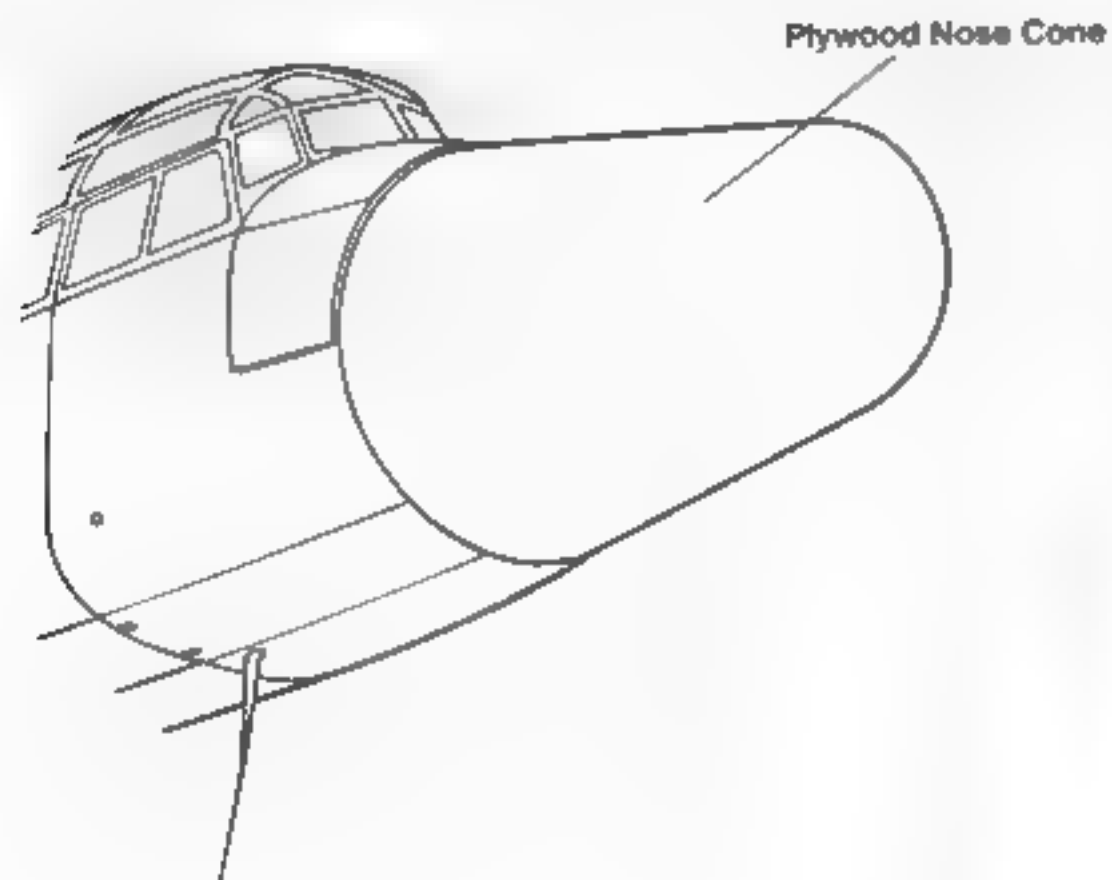


This Ju 88G-6 (3C+MN) of 8./NJG 4 was one of the few Ju 88G-6s to be equipped with the FuG 240 Berlin radar. The FuG 240 antenna was protected by a wooden nose cap (foreground). The aircraft has a replacement cowling and rudder from another aircraft that was in a different camouflage. (Manfred Griehl)

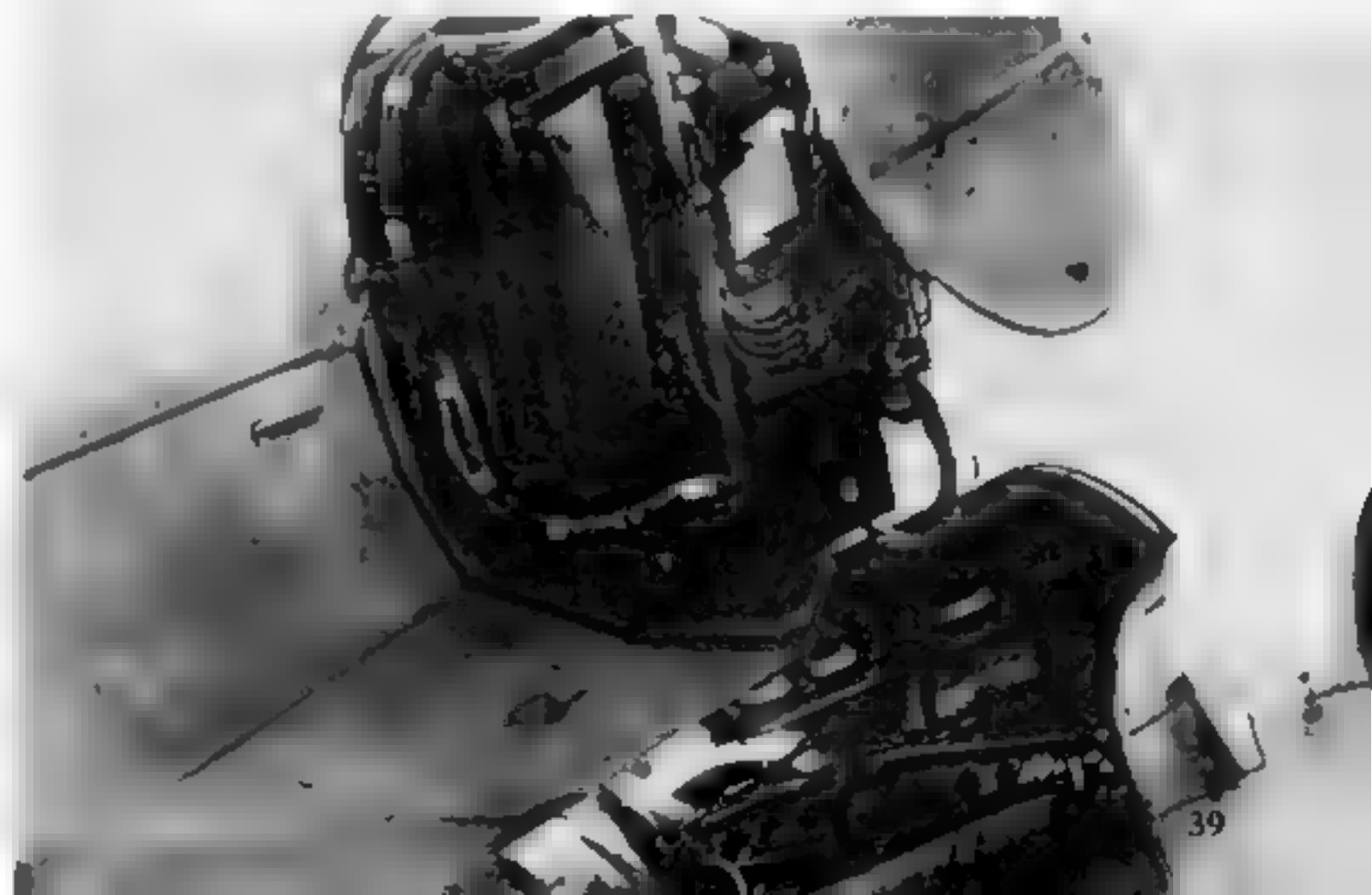


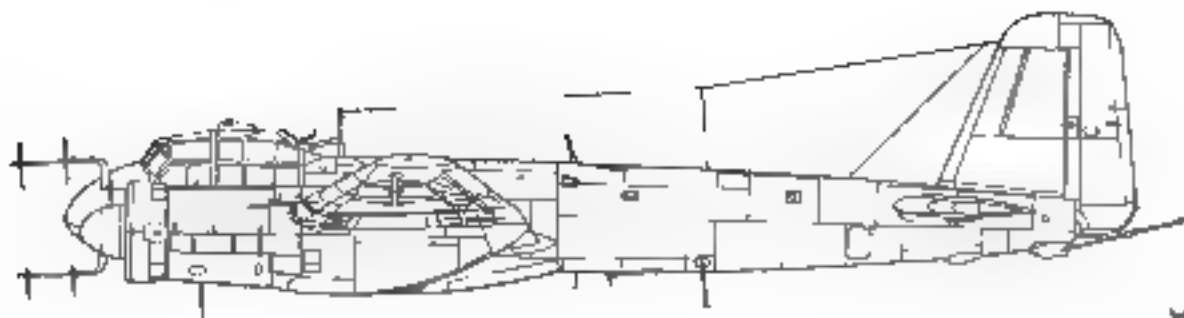
After it was captured, 3C+MN was reassembled by the British and evaluated. The nose cap is probably a replacement from another aircraft, since it has a letter "G" on the tip instead of the correct aircraft identification letter "M." FuG 217 rear warning antennas are visible under the port wing, a common position for Ju 88G-6s. (Imperial War Museum)

FuG 240 Berlin N1 Radome



The Berlin radar featured an advanced dish type adjustable antenna which eliminated the drag producing antennas seen on most German night-fighters. This radar was fitted almost exclusively to Ju 88G-6s. (Manfred Griehl)





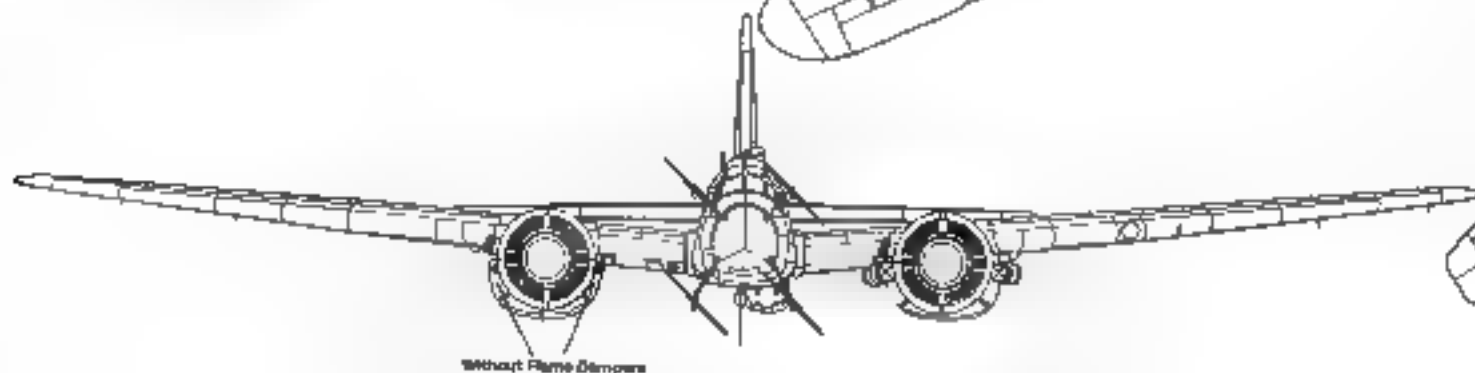
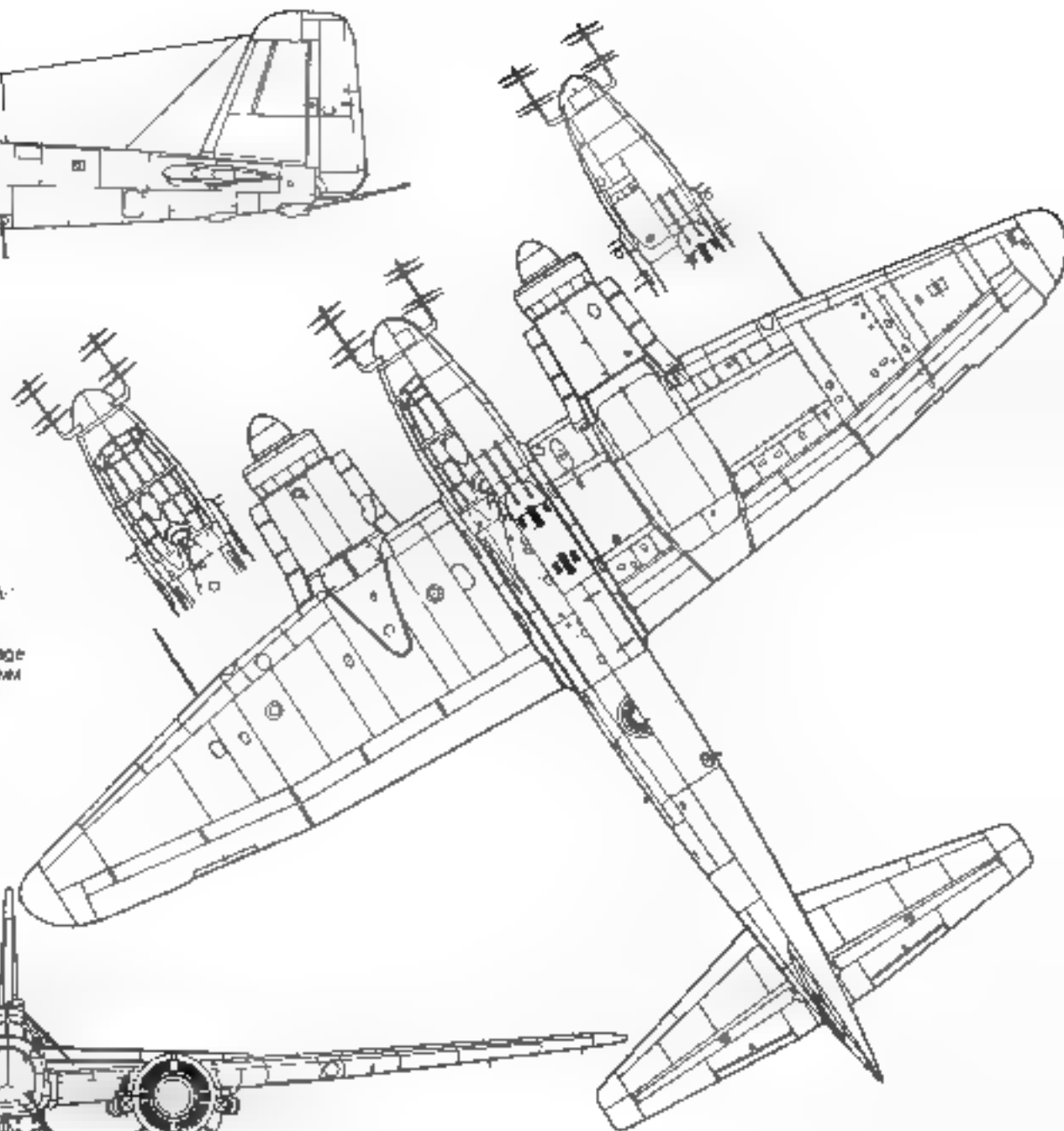
Specifications

Junkers Ju 88G-6

Wingspan 66 feet 7 inches
Length 64 feet (varies with radar type)
Height 16 feet
Maximum Weight 27,337 pounds
Powerplant Two 1,750 hp Junkers Jumo 213A liquid cooled engines

Armament Four 20mm cannons in underfuselage pod. One or two upward firing 20mm cannons and one 3mm rear firing machine gun.

Performance
Maximum Speed 360 mph
Service ceiling 31,515 feet
Range 1,364 miles
Crew Three or Four



without Flame Dampers

Ju 88G-7

Long considered to be a major variant, and often confused with the Ju 88G-6, the Ju 88G-7 was undergoing development when the war ended and did not enter production. According to German documents, the Ju 88G-7 was developed from the Ju 88G-6, but was equipped with two Junkers Jumo 213E-1 engines with MW 50 (water-methanol) boost systems driving four-bladed VS-19 paddle blade propellers. Provisionally, the wings were to be extended with outer wing panels of the Ju 188 series, providing a total span of 72 feet 2 inches. Armament was similar to that of the Ju 88G-6, including the rear firing MG 13, machine gun and two rearward mounted 30MM *Schräge Musik* cannons.

The proposed radar for the Ju 88G-7 was to be the FuG 220 SN-2 employing the *Morgenstern* antenna arrangement, or the FuG 240 *Berlin* radar. The crew was specified as four men. Wing and fuselage fuel loads were comparable to the Ju 88G-6 (847 gallons / 3,205 liters). Alternate sources indicated that the Ju 88G-7 possessed a top speed of 398.6 mph, a range of 1,376 miles, a weight of 28,924 pounds and a ceiling of 32,340 feet.

Among the known prototypes were the Ju 88V-112, V-113, V-114 and V-115. The first two prototypes, which were ordered in November of 1944, were destroyed by Allied bombing in March of 1945. The Ju 88V-114 and V-115 were reportedly undergoing assembly at Dessau during March and April of 1945, but had not yet received their power plants.

Ju 88G-10

Intended as an ultra-long-range night-fighter, the Ju 88G-10 was basically a Ju 88G-6, with an extended fuselage (8 feet 11 3/4 inches) housing additional fuel tanks. The aircraft was powered by two 1,750 hp Junkers Jumo 213A liquid cooled in-line engines and armament was provisionally to have been the same as the Ju 88G-6.

Construction of the Ju 88G-10s was begun during early 1945 and prototype flight trials ran into the Spring of that year. Only a small number of Ju 88G-10 were actually completed. These, however, were not issued to service units in their intended role. As the war situation continued to deteriorate, most Ju 88G-10s were reassigned to the *Mistel* flying-bomb program. They were converted as lower bomb component aircraft, using Focke-Wulf Fw 190 fighters as the control aircraft.

Ju 88P

Within a year after Germany's invasion of the Soviet Union, a sense of alarm had spread over the unexpected increase in the number and quality of Russian armored forces. By late 1942, any Luftwaffe aircraft capable of mounting anti-tank weaponry was being tested and prepared for experimental operations within special *panzerjägerstaffeln* (tank-fighting squadrons). Modifications of Ju 88A bombers for the anti-tank role were undertaken in the field, as well as at various *Erprobungstellen* (testing establishments). These early trials, however, achieved only limited success with an armament of multiple cannon batteries and air-to-ground rockets.

The first heavy cannon-armed Ju 88 prototype was modified from a Ju 88A-4 bomber during mid-1942. It was armed with a 75MM KwK 39 (*Kampfwagen-kanone* 39) mounted offset to port inside a large under fuselage gondola. The gun was fitted with a horizontally 'fluted' muzzle brake to reduce recoil. The gun's magazine and the attachment



The Ju 88G-10 was intended to be an ultra-long-range version of the Ju 88G-6 night-fighter, carrying additional fuel tanks in the extended rear fuselage. Most Ju 88G-10s were transferred to the *Mistel* flying-bomb program late in the war. (Bundesarchiv)

In an effort to combat Soviet armor, unsuccessful trials were conducted with air launched anti-tank rockets. This battery of rocket tubes was suspended from the ETC racks of a Ju 88A-4 bomber, with each tube being fed by a cylindrical magazine. (Gene Stafford)



points for the mounting frame were located in the rear bomb bay. Although the transparent bomber nose was retained, a fighter type armored windshield, applique armor and extra lower cockpit armor was added for low-altitude crew protection. Crew entry was made through a hatch on the starboard side of the ventral cannon pod.

Primary testing of the Ju 88P prototype (alternately referred to as the Ju 88P V-1) was conducted at the Roggenthin branch of the *Erprobungsstelle Rechlin*. It was found that the under fuselage pod and the aircraft's increased loaded weight caused a serious reduction in speed and maneuverability. The recoil and muzzle blast when the 75MM cannon was fired reportedly caused damage to the propellers and a number of landing gear failures also occurred. As a partial solution, the KwK 39 cannon was replaced with the similar PAK 40 (*Panzerabwehrkanone 40*) cannon, with a revised straight muzzle brake. Even though the Ju 88P prototype continued to suffer teething problems, live-fire tests against captured Soviet tanks were successful and plans were approved for a limited production run under the designation Ju 88P-1. Development work on the Ju 88P series continued, leading to several different variants.

Ju 88P-1

The Ju 88P-1 differed from the first prototype in having a metal fighter nose and an optional lower rear firing 7.92MM MG 81Z defensive gun position in the ventral cannon pod. The upper canopy maintained the same configuration as the Ju 88A-4 with two rear firing MG 81J machine guns in a double bulged canopy. Additionally, an optional windshield mounted MG 81J could be used for forward defense. Like the Ju 88A-4, the Ju 88P-1 was powered by two 1,400 hp Jumo 211 engines.

During early 1943, Ju 88P-1s joined other anti-tank aircraft assigned to the *Versuchskommando für Panzerbekämpfung* (Experimental Command for Tank Fighting) on the Eastern front. Despite the fact that the Ju 88P and the Bf 110 offered the poorest combat performance of all types tested, the Ju 88P was pressed into service with the *Panzerjäger Staffel 92* under the *Führer der Panzerjäger* and later with *III Gruppe of Kampfgeschwader 1 Hindenburg*, which served as an evaluation unit. The Ju 88P-1 had restricted maneuverability and its main armament had a slow rate of fire (usually two rounds per pass).

Ju 88P-2 and Ju 88P-3

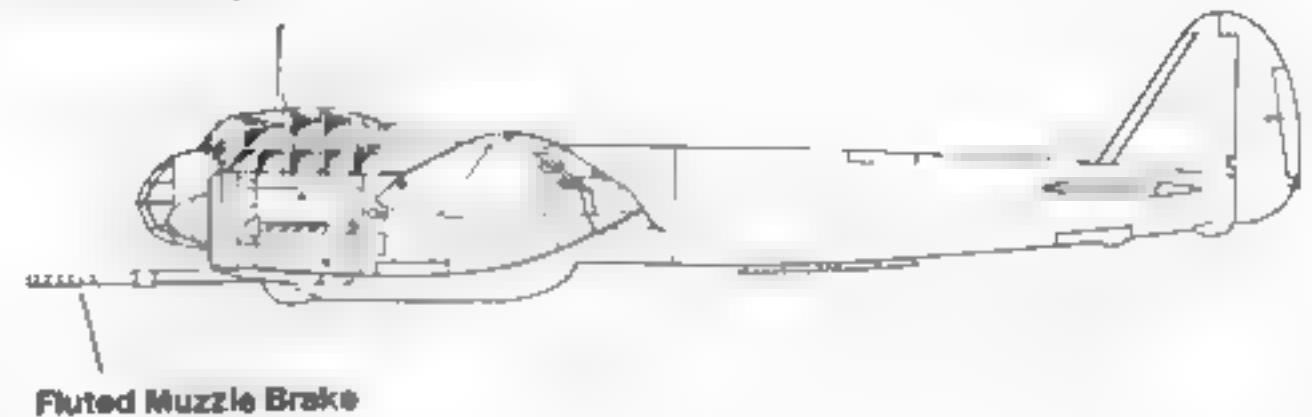
Converted from Ju 88A-4 bombers, the Ju 88P-2 featured a wider ventral pod for carrying two 37MM BK 3.7 (*Bord Kanone 3.7cm*) cannons. These guns offered an increased rate of fire, less recoil and a proven ability to penetrate Russian armor using Wolfram-core anti-tank rounds. A ventral, rear firing MG 81Z and two upper rear firing MG 81J machine guns were maintained for defense. High profile armored windshields and applique armor were provided for protection of the crew.

Identical to the Ju 88P-2, the Ju 88P-3 featured additional armor plating to protect the engine and crew against ground fire. While the Ju 88P-2 was alternately considered to be an "anti-bomber" heavy fighter, the P-3 was intended solely for ground-attack and anti-tank duties.

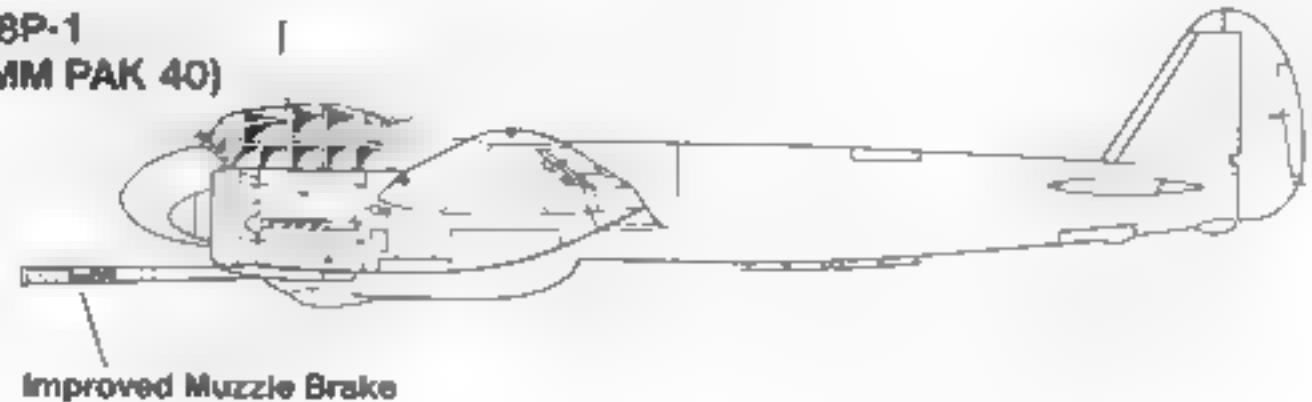


The first heavy cannon armed Ju 88 prototype (also referred to as the Ju 88P V-1) was a Ju 88A-4 bomber fitted with a KwK 39 75mm cannon, armored windshield, applique armor and additional armor under the nose. The fluted muzzle brake was intended to reduce the weapon's recoil.

Ju 88P-V1
(75 MM KWK 39)



Ju 88P-1
(75 MM PAK 40)





Prior to production of the Ju 88P-1, a 75mm PAK 40 cannon was adapted as standard and fitted with an improved muzzle brake. The cannon was offset to port in the ventral pod, which also featured the crew entry hatch. Lower fuselage side windows are visible behind the fighter-type metal nose cap. (George Punka)

Ju 88P-4

The last of the Ju 88P series, the Ju 88P-4 entered production during 1944, on a limited basis. It was similar to the Ju 88P-1, but featured a revised cannon pod housing a single 50mm BK 5 cannon. Defensive machine gun positions remained the same as the Ju 88P-1, although sources also indicated the possibility of a single rear firing MG 131 canopy machine gun, as well as optional ETC bomb racks for ground-attack missions.

Final Operations

Unfortunately, little was gained with the Ju 88P, since they all suffered from poor performance. Their average speed of 244 mph left them susceptible to enemy ground fire and fighter interception.

The Ju 88P-2s were briefly used for night interceptions of American bombers, where their slow speed rendered them next to useless. Later, some Ju 88Ps were used as experimental radar-equipped night-fighters, with modified ventral pods housing lower caliber weapons. Finally, surviving Ju 88P-3s and Ju 88P-4s were reportedly assigned to *Nachtschlacht* (Night Ground-attack) units during the closing months of the war.



Due to its slow speed, the Ju 88P-1 was not very effective, but it did see combat on the Eastern Front. The upper canopy and defensive gun positions were identical to those of the Ju 88A-4 bomber. This Ju 88P-1 featured a Yellow Russian Front fuselage band and a White unit shield on the nose. (George Punka)

Ju 88P-2/3



Two 37 MM Cannons

Ju 88P-4



One 50 MM Cannon

The Ju 88P-2 and P-3 were externally similar, the P-3 having increased ventral armor plating for the ground attack role. This aircraft (coded SO+GV) has a full armored windshield and a wider ventral gondola with two 37mm BK 3.7 cannons offset to port. The later Ju 88P-4 version featured a reduced size ventral bin with a single 50mm BK 5 cannon. (Gene Stafford)



Mistel Flying Bombs

The original *Mistel* (Mistletoe) flying bombs were created by mating a Messerschmitt Bf 109F "controller" fighter and a 8,380 pound shaped charge warhead to an expendable war-weary Ju 88A-4 bomber. Experimental versions quickly proved the destructive force of these high-penetration weapons and subsequent planning was dedicated to the development of an expanded range of *Beethoven Devices* (the project's official code name).

By the time IV KG 101 was employing the first *Mistel 1*s against Allied invasion ships off the coast of France during July of 1944, a number of further *Mistel* conversions had been proposed, using surplus Ju 88 fighters as the lower flying bomb component. One advantage of using the fighter variants was their more powerful engines, which gave the combination additional power to lift the six-foot diameter *Mistel* warheads. In the event, several Ju 88 fighter variants were utilized during the *Mistel* program.

Mistel 1

Although largely regarded as the mating of a Ju 88A-4 bomber and a Bf 109F fighter, the similarity between the Ju 88A-4 and the Ju 88C-6 fighter allowed the use of Ju 88C-6s in place of the Ju 88A-4 as *Mistel 1*s. Although this is not fully confirmed, photographs have revealed Bf 109s mounted on top Ju 88s with definite C-6 characteristics (metal nose caps, applique armor and armored windshields).

Mistel 2

The conversion of Ju 88G-1 fighters to the *Mistel* role was undertaken at the Junkers Leipzig-Mockau facility during 1944 and included the installation of the Df S-designed fighter-support "tripods". The fighter tail-support strut of the *Mistel 2* was a "buckle strut" type with a forward-flexing knee joint that allowed the fighter to attain a nose up attitude on separation.

Both the Ju 88G-1 and the Fw 190A could be configured with drop tanks to increase combat range, the Ju 88G-1 carrying the tanks on ETC bomb racks. Additionally, the Ju 88G and Fw 190A could share the 95-octane fuel on the way to the target area since both were equipped with fuel-compatible BMW 801 power plants.

Like the *Mistel 1*, the warheads of the *Mistel 2* used either long stand-off probes for maximum target penetration, or short probes for surface detonation. When fully loaded, takeoff with the *Mistel 2* was tricky since the Ju 88G frequently lacked brakes. Once the takeoff run was started, there was often no turning back. The Fw 190A-6 or A-8 fighters retained their wing-mounted 20MM cannons for self-defense or for making strafing attacks after releasing the Ju 88 flying bomb.

The *Mistel S2* was the trainer version of the *Mistel 2* flying bomb, retaining a crew cabin on the Ju 88G-1 for an instructor. The student pilot flew in the Fw 190A-8 or F-8 fighter. The Ju 88 has had its upper surfaces heavily mottled with late war Dark Green camouflage. (USAF)



Mistel S2

The *Mistel S2* was the training version of the *Mistel 2*. Both aircraft were unarmed and the Ju 88G retained a cabin for a two man training crew. Additional forward support struts were installed to prevent the fighter from accidentally dipping its propeller into the Ju 88 on separation. On some Ju 88G-1s a full bomber-type cabin was added, complete with the transparent nose. This was done to improve forward and downward visibility for the Ju 88 crew.

Mistel 3C and Mistel S3C

This variant combined a warhead armed Ju 88G-10 with an Fw 190A or Fw 190F fighter. Although the Junkers Jumo 213A in-line engine of the Ju 88G-10 was not fuel-compatible with the BMW 801 engine of the Fw 190, 95-octane fuel for the Fw 190 could be carried in the extra fuel cells housed in the Ju 88G-10's stretched fuselage.

The *Mistel S3C* was the trainer version of the *Mistel 3C*, with a crew cabin retained on the Ju 88G-10, and extra forward support struts.

Operations

During the last months of 1944, several plans were evaluated for using *Mistels* in a major strike against the British fleet at Scapa Flow, but for various reasons all these plans were postponed.

An alternative plan was soon considered, based on a scheme first devised during 1943. This plan recommended a long-range bomber strike against the largely non-integrated power stations of the Soviet Union. Such a strike would have brought the Russian armaments industry to a sudden stand-still. Soviet advances along the Eastern Front, however, after their Spring offensive of 1944, had overrun the forward Luftwaffe air bases needed for the operation and it was continually revised and postponed.

Near the end of 1944, a revamped version of *Unternehmen Eisenhammer* (Operation IRON HAMMER) called for an early-morning raid against twelve steam and hydro-electric power stations located east of Moscow. The raid was to be carried out by 100 *Mistels* (expected to be available by February of 1945) and over 150 Heinkel He 111s, He 177s and Ju 88s acting as *Beleuchter*s (illumination) with marking flares. The operation was to be led by the special-operations unit, II KG 200. Other units included I and II KG 30 with additional aircrews from KG 6 and *Lehrgeschwader 1*.

In March of 1945, near the eve of the IRON HAMMER raid, Russian troops crossed the Vistula river and pressed into the heart of the Third Reich. Operation IRON HAMMER was immediately postponed and the mission commander, Werner Baumbach, was ordered to concentrate his forces against Soviet bridgeheads. Although some *Mistels* were reserved for a resumption of IRON HAMMER the bulk of *Mistel 1s*, *Mistel 2s* and *Mistel 3s* that remained were launched against bridges over the Oder, Neisse, Rhine and Vistula rivers. The first *Mistel* attack, along with Ju 88s, Ju 188s and He 111s, was made on 8 March 1945, with attacks continuing until late April. Each time the *Mistel* crews were challenged by Allied air and flak defenses surrounding the bridges, although a number of the bridges were successfully destroyed. By 8 May 1945, few combat *Mistels* remained and most of the aircraft found by occupying Allied forces were trainer versions.



Trainer *Mistels* usually featured additional nose supports to prevent the upper fighter from dipping the propeller into the Ju 88's cockpit on separation. The Ju 88G-1 has had all armament deleted, but retained the ETC racks for carrying drop tanks. (USAF)

Mistel 3C and *S3C* combinations utilized long-bodied Ju 88G-10s as the lower component and Fw 190s as the controller aircraft. These *Mistel S3C* trainers were abandoned on a bomb-cratered airfield at the end of the war. Most of the armed versions had already been expended in combat. (USAF)



Ju 188 *Rächer* (Avenger)

Although the Ju 88B and Ju 88E series failed to secure production orders from the RLM, Junkers continued development of these high performance airframes. Additionally, Junkers was conducting research for the advanced *Bomber B* program (the Ju 288) and desired a potential backup project should the *Bomber B* prototypes fail to meet expectations.

The prototype for Junker's interim bomber was the Ju 88V-44 (NF + KQ) which first appeared during 1942. The Ju 88V-44 featured a "bubble" crew cabin with a power driven upper machine gun turret. The ventral gun position was equipped with a flexible 7.92MM MG 81Z machine gun, while both the power turret and the upper rear firing gun position carried 13MM MG 131 machine guns. A flexible 20MM MG 151 cannon was mounted in the cabin nose and fired by the bombardier.

To improve handling characteristics and stability, the wingtips were tapered and extended, increasing the overall wingspan to 72 feet 2 inches (from 65 feet 7 1/2 inches for the Ju 88B/E). The horizontal stabilizers were extended and squared off, while the vertical fin was heightened and broadened. For protection against barrage balloon cables, *Kato-Nase* cutters were installed in the wing leading edges and provision was made for cutters to be installed on the nose.

The RLM, impressed with the new design, redesignated the Ju 88V-44 as the Ju 188V-1 and a second prototype (WN 260151) was designated as the Ju 188V-2. Although both machines were experimentally fitted with several optional power plants, the first production aircraft were fitted with 1,700 hp BMW 801D-2 radial engines. Maximum speed of

This Ju 188 (WN 10001) was the first Ju 188E production aircraft and was almost identical to the Ju 188V-1. The first Ju 188s were powered by smooth-cowled BMW 801MA engines and retained the underwing dive brakes. Later models featured BMW 801D or G engines and had the dive brakes removed. (Hans Redemann)

the Ju 188 was increased by some 15-20 mph over the Ju 88A-4 bomber, while the bomb and fuel loads remained similar to the Ju 88A series.

The first production Ju 188, the Ju 188A, was intended to use Junkers Jumo 213A in-line engines which were in short supply. As a result, initial production airframes were powered by BMW 801 radial engines. This meant that the pre-planned Ju 188E series actually preceded the Ju 188A series into front line service.

The Ju 188 was put into dispersed production with a number of different subcontractors. Sources disagree on exactly how many Ju 188s were manufactured, but, by the end of 1944, some 1,076 Ju 188s had been produced (including 570 reconnaissance versions).

Ju 188A-1, A-2 and A-3

Provisionally designated as a dive-bomber equipped with underwing "bench" style dive brakes, the Ju 188A-1 did not enter production as dive-bombing was considered obsolete by mid-war.

The Ju 188A-2 was identical to the A-1, but had the underwing dive brakes deleted. It was powered by two 1,750 hp Jumo 213A-1 in-line engines, driving VS-111 paddle blade propellers. An optional MW 50 water-methanol boost system provided up to 1,800 hp at 15,000 feet and over 2,000 hp on takeoff. Defensive armament was the same as the Ju 188V-1, but the powered upper turret could be equipped with an optional 20MM MG 151 cannon. Maximum speed of the Ju 188A-2 was 323 mph at a loaded weight of 31,967 pounds.

The Ju 188A-3 was the same as the A-2, but had the four underwing ETC bomb racks replaced by two PVC racks for carrying torpedos. Like the Ju 88A-4/Torp and the Ju 88A-17 models, the Ju 188A-3 was fitted with a torpedo-control housing on the starboard side of the fuselage nose. Provision was made for the optional use of FuG 200 *Hohentwiel* maritime search radar, which featured triple-mast nose-mounted "Yagi" type antennas.



Ju 188D-1 and D-2

The Ju 188D-1 was a reconnaissance variant of the Ju 188A-2 and often had the nose MG 151 cannon deleted. Cameras were mounted in the rear fuselage underside (like the Ju 88 D-1) and two ETC bomb racks were usually retained for carrying drop tanks. Optional fuselage bomb bay fuel tanks were usually installed giving the Ju 188Ds a maximum range of up to 2,110 miles.

Intended for anti-shipping reconnaissance, the Ju 188D-2 was the same as the Ju 188D-1, but with provision for carrying FuG 200 *Hohentwiel* search radar

Ju 188E-1 and E-2

The first combat variant produced, the Ju 188E-1 was powered by two 1,700 hp BMW 801D-2 or G-2 radial engines, driving thin-chord VDM metal propellers. Except for the power plants, the Ju 188E-1 was the same as the Ju 188A-2 and usually carried a 13 MM MG 131 gun in the powered turret. Early Ju 188E-1s retained the "bench" dive brakes, which were later deleted.

The Ju 188E-2 was the torpedo-bomber version of the Ju 188E-1, featuring the two PVC underwing torpedo racks and torpedo-control housing on the starboard fuselage nose. FuG 200 *Hohentwiel* search radar was optional and the upper powered turret was often removed to reduce weight (an option on all Ju 188 versions.)

Ju 188F-1 and F-2

The Ju 188F-1 was a reconnaissance version of the Ju 188E-1, with underside rear fuselage cameras and the flexible nose mounted MG 151 cannon deleted.

The Ju 188F-2 was the same as the Ju 188F-1, but with provision for FuG 200 search-radar and BMW 801G-2 radial engines as standard.

Ju188R-0

Although it did not enter production, the Ju 188R was intended to be the *Zerstörer* or night-fighter variant of the Ju 188. Fixed forward firing armament was two to five 20MM MG 151 or alternate 30MM MK 103 cannons mounted in the starboard cabin and lower fuselage nose. Antennas for FuG 212 radar were to be attached to the nose and sheets of angled armor plate were added to the forward cockpit interior.

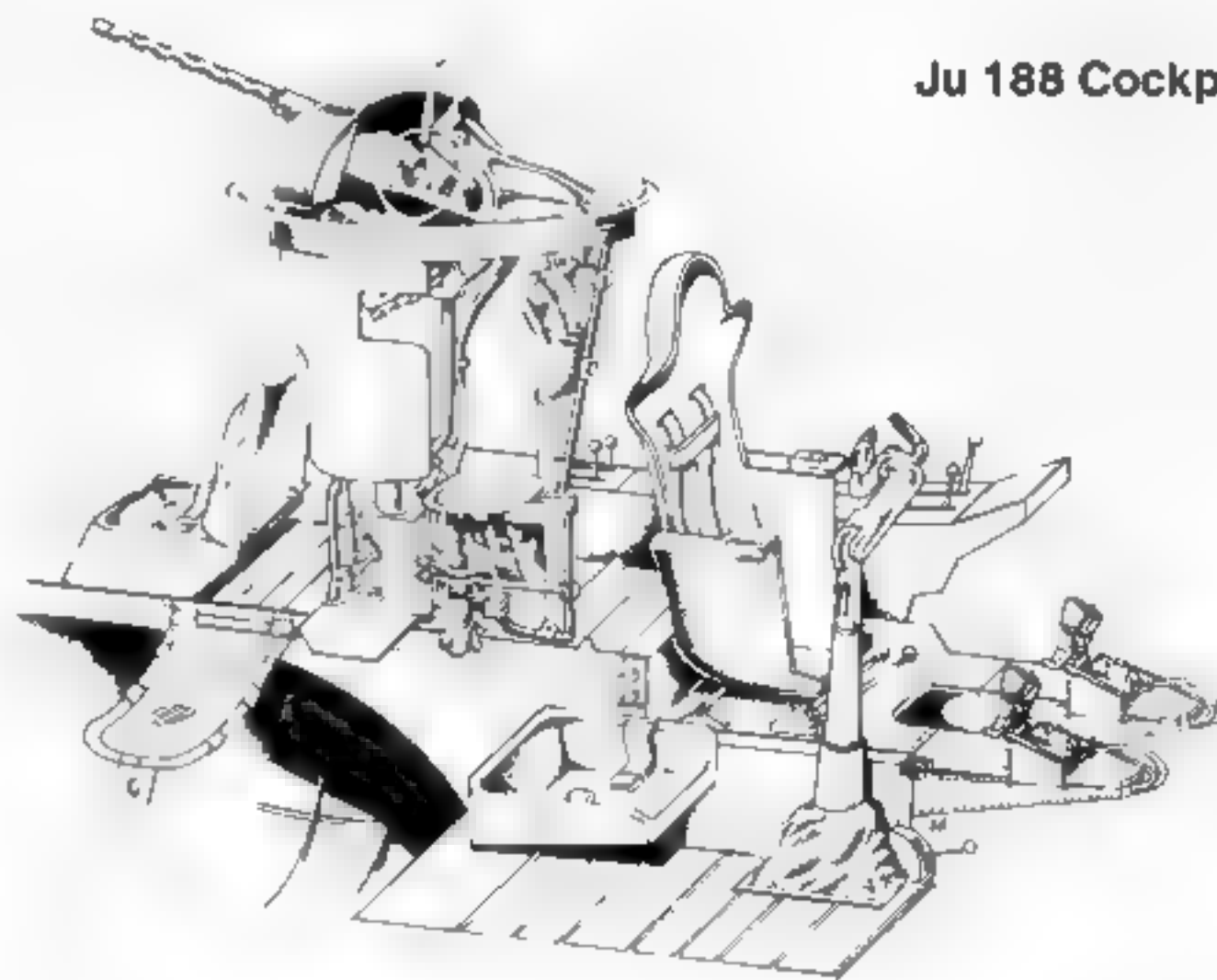
Ju 188S and Ju 188T

The Ju 188S was intended as a high altitude bomber, featuring a sleek pressurized three-seat nose with the ventral gun position deleted. All armament was removed as the Ju 188S depended on altitude and speed to avoid interception. Power was provided by two Junkers Jumo 213E-1 in-line engines with GM-1 nitrous-oxide boost, providing a maximum speed of 426 mph. The reduced 1,764 pound bomb load was carried in the fuselage bomb bays only.

An anti-tank variant, mounting an under fuselage 50MM BK 5 cannon pod, was given the provisional designation Ju 188S-1/L. Limited production of the Ju 188S-1 reportedly



With its bubble cabin, extended wings and enlarged tail surfaces, the Ju 188V-44 (NF+KQ) prototype became the pattern aircraft for the Ju 188 series and was redesignated the Ju 188V-1. Ultimately, some 1,076 Ju 188s would be produced, serving on all battle fronts. (Hans Redemann)



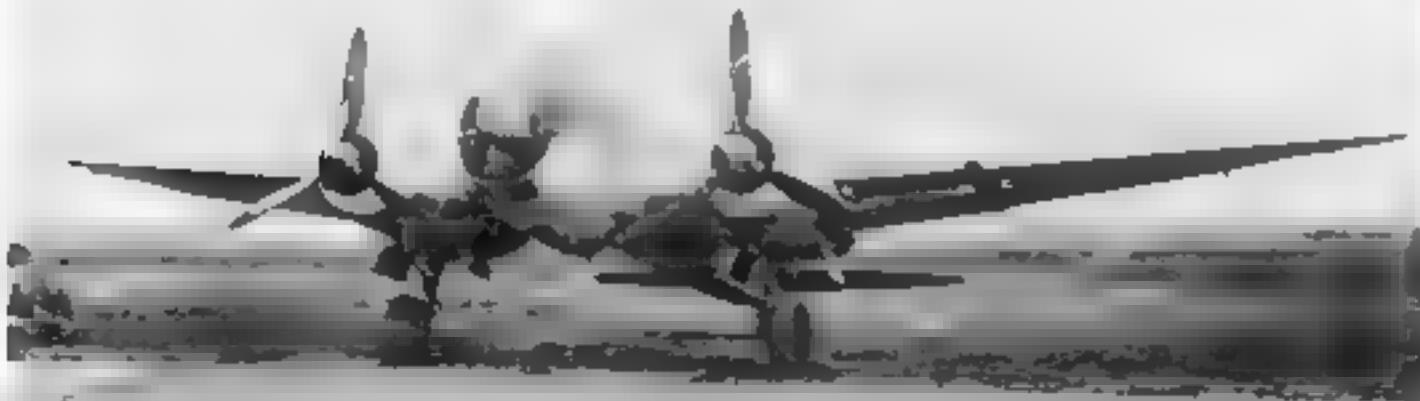
Ju 188 Cockpit



ST+GL was a Ju 188E converted into a personal transport for GEN Field Marshall Erhard Milch. The aircraft carries an MG 131 machine gun in the nose position and the entire aircraft has been heavily resprayed with Light Blue on the fuselage sides and as a heavy mottle on the upper surfaces. (Hans Redeman)

The bubble nose of the Ju 188 offered an improved all round vision as compared to the Ju 88A series, although the crew positions remained basically the same. In an emergency the pilot's control yoke could be swung over to the bombardier's position to allow him to fly the aircraft. (Bundesarchiv)

Milch's transport conversion retained canopy framing in two tone Green. The fuselage/underwing code letters are in Black and fuselage national insignia was in a White outline style. (Hans Redeman)

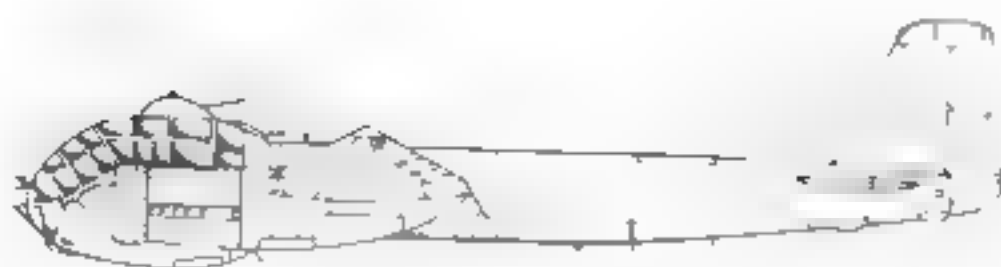




The flexible nose mounted 20mm MG 151 cannon was somewhat difficult to handle, although it packed a substantial punch. The curved head rest visible behind the crewman is the pilot's armored seat. The structure on the nose tip is an optional barrage balloon cable cutter. (Bundesarchiv)

Ju 188 Development

Ju 188A-2



Ju 188D-2



Ju 188A-3



Ju 188E-1





A gunner mans the rear cabin 13mm MG 131 machine gun on a Ju 188. The armored gunmount rotated a full 360 degrees and the canvas tube carried the shell casings to an ejection port on the lower starboard side of the fuselage. This gunmount was the same as that used for the rear-upper position of Ju 88C-6 (late), Ju 88R and Ju 88G series night-fighters. (Bundesarchiv)



The rear and upper defense for the Ju 188 was essentially the same on all variants, although the upper EDL turret of the Ju 188A series usually carried a 20mm MG 151 cannon, while the Ju 188E series mounted a 13mm MG 131 machine gun. On many Ju 188s the turret was removed to increase speed. Flash suppressors were optional on all guns. (Bundesarchiv)

Ju 188E-2



Ju 188F-1



Ju 188R (Projected Night Fighter)



Ju 188S-1/T-1





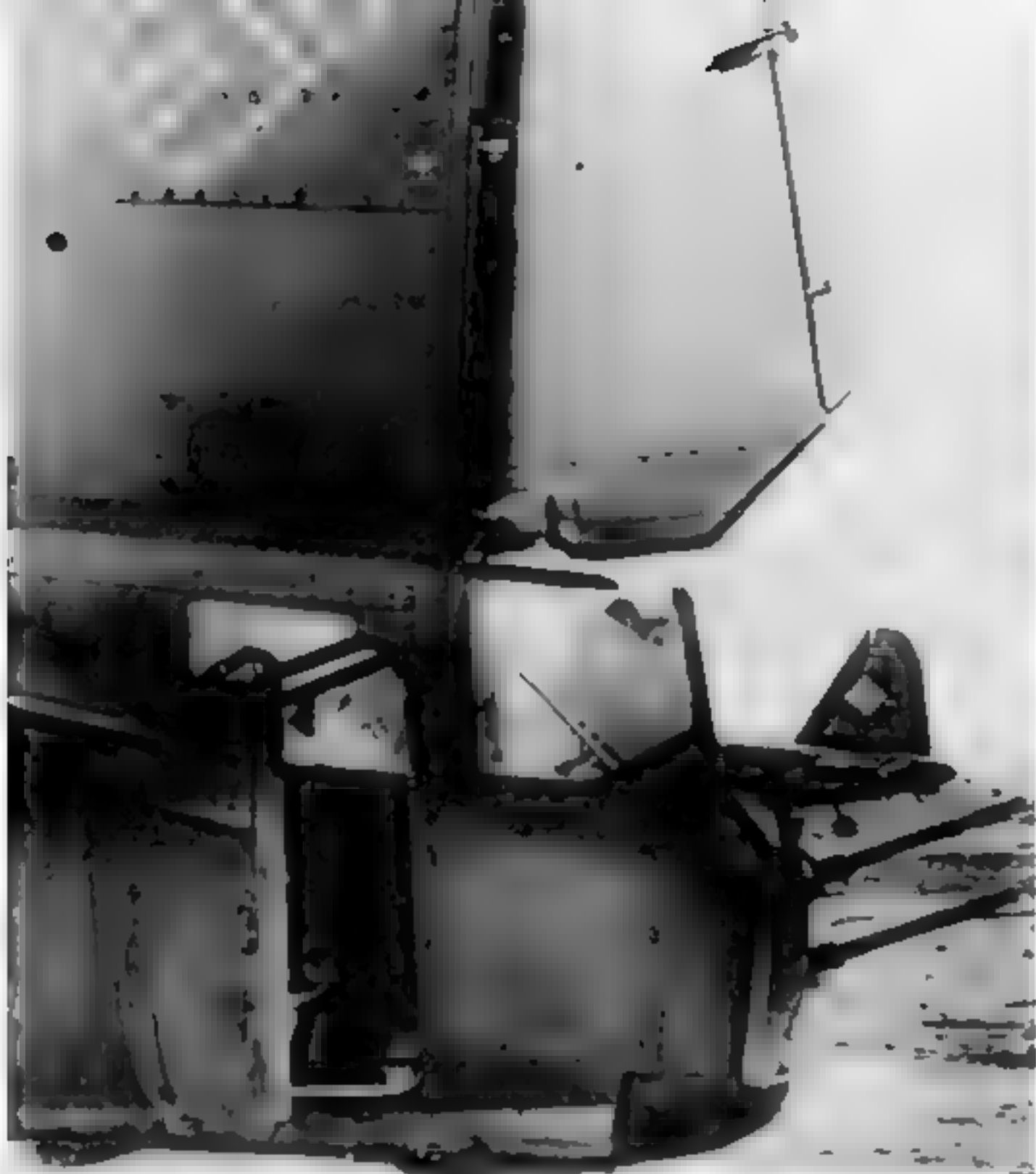
The Ju 188E-3 was a limited production torpedo-bomber version of the Ju 188E-1. One PVC rack was carried under each inboard wing panel and a torpedo control housing was mounted on the starboard nose. BMW 801G engines were standard, while FuG200 *Hohentwiel* anti-shiping search radar was optional. Optional FuG 217 rear warning antennas are mounted beneath both wings.



(Left) Crew entry on all Ju 188s was made through a lower fuselage hatch, which featured a shell casing ejection port for the ventral rear firing machine gun (either an MG 131 or MG 81Z). The light colored streak on the upper nose marks the position of the flare pistol port. (Bundesarchiv)

This Ju 188F was a reconnaissance variant of the Ju 188E with the bomb sight and nose mounted gun deleted and with optional long range drop tanks carried on the underwing ETC racks. The low-visibility "A6" code identifies this aircraft as being assigned to *Fernaufklarungsgruppe 120*. (Bundesarchiv)

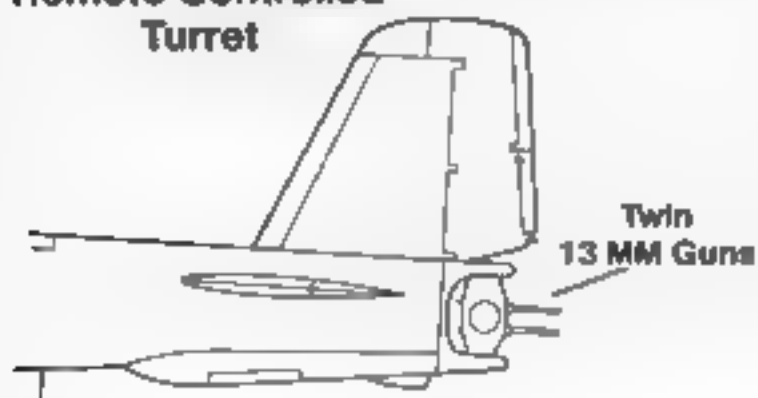




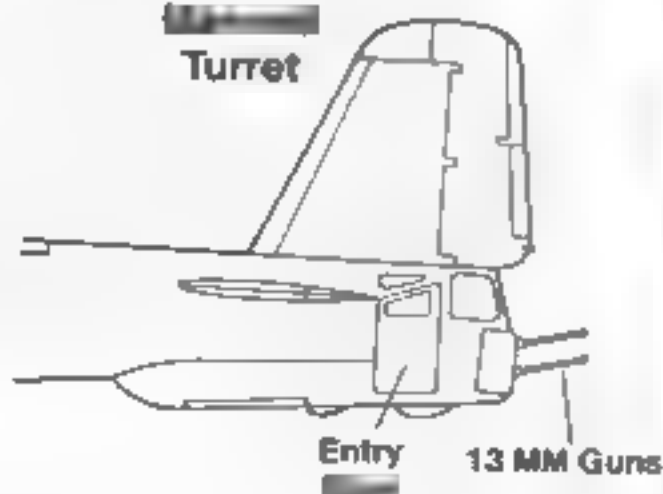
The manned turret was armed with twin over/under 13mm MG 131 machine guns. The overly cramped gunner's compartment was officially rejected and was not placed into production. Another proposed tail turret was the troublesome FA 15/FLH 15 unmanned turret, which also failed to see production on the Ju 188. (Manfred Griehl)

Proposed Tail Turrets

Remote Controlled
Turret

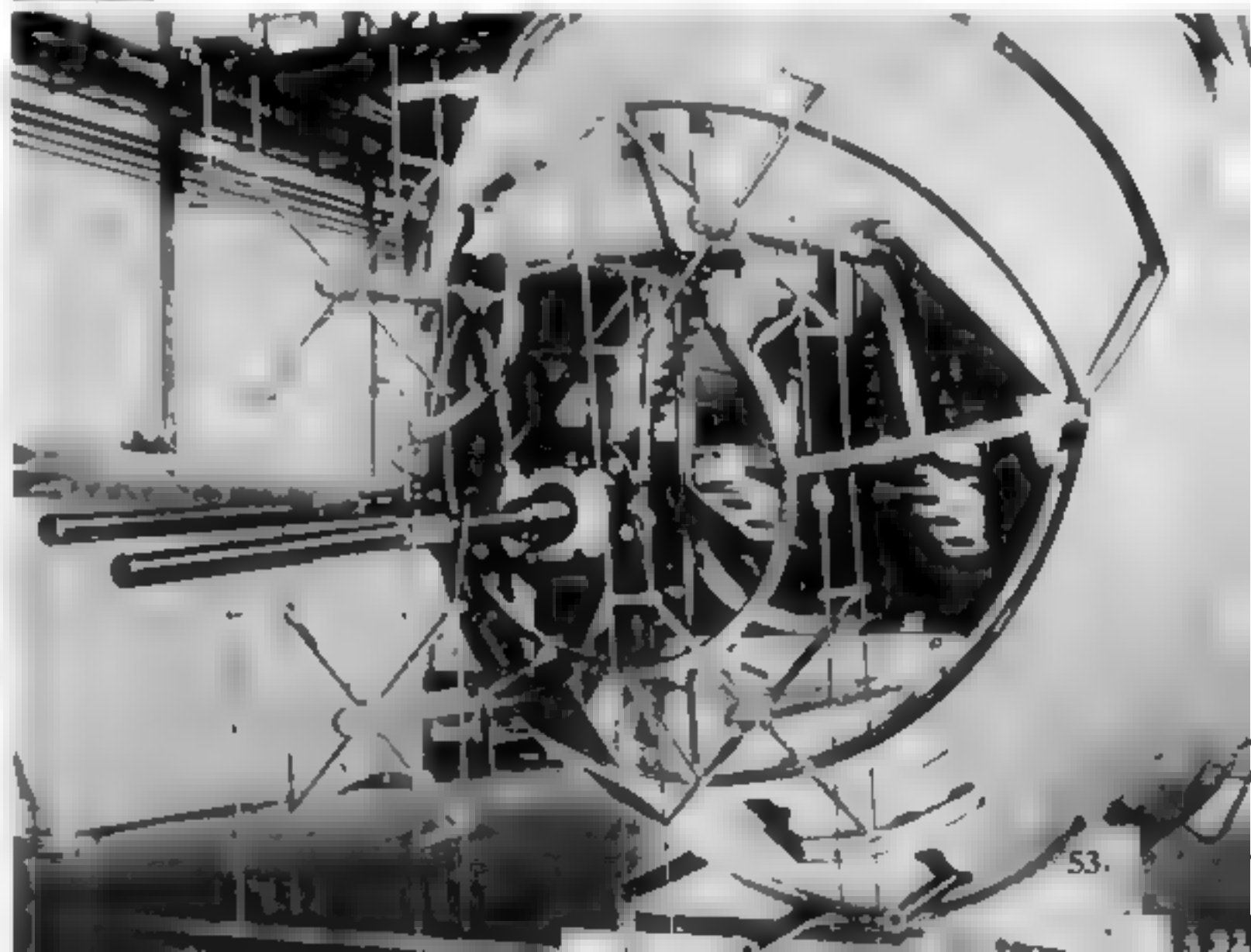


Turret



This Ju 188 (WN 260151) was redesignated the Ju 188V-2 and served as the prototype for the reconnaissance variant. The aircraft later served as a test bed for a proposed manned tail gunner's position. The deepened rear fuselage accommodated the tail turret. (Hans Redemann)

Although it did not enter production, the Ju 188R series was to have been the *Zerstörer* and *Nachtjäger* version of the Ju 188. This cabin mock up shows one proposed armament configuration of five fixed MG 151 20mm cannons, along with an FuG 212 radar and internal



Ju 288

Several months before the RLM officially announced the "state of the art" *Bomber B* program in July of 1939, Junkers designers had commenced work on an advanced bomber prototype. In fact, the design principals employed by Junkers had heavily influenced the actual criteria set forth in the RLM specifications. Unfortunately the new bomber, designated as the Ju 288, was delayed by technical flaws which continually postponed production until the RLM finally cancelled the program during 1943 due to the shifting war situation.

Overall, a total of twenty-two Ju 288 prototypes were constructed, which were aimed at a Ju 288A series (Ju 288V-1 through V-8), a Ju 288B series (Ju 288V-9 through V-14) and a Ju 288C series (Ju 288V-101 through V-108). The original crew cabin was a three seat "bubble" design, which was changed on later prototypes to a four seat configuration. The empennage had twin vertical tails, which remained standard on all the Ju 288 prototypes. The broad chord wings featured "bench" type dive brakes near the wing trailing edge, and as development progressed, the wing span was increased from sixty feet (Ju 288V-1) to approximately seventy-four feet (Ju 288V-108).

Due to delays with the proposed Junkers Jumo 222A/B (1,690-2,000 hp), Daimler Benz DB 606A/B and DB 610A/B (2,080-2,500 hp) twenty-four cylinder in line liquid cooled engines, the Ju 288V-1 through V-4 and the Ju 288V-7 were flight tested using



The Ju 288V-2 prototype (D-ABWP) suffered the collapse of its dual wheeled landing gear during testing. The slender "bubble" crew cabin and lateral sighting blisters were typical of the early Ju 288 prototypes. (Manfred Griehl)

Ju 288 Development

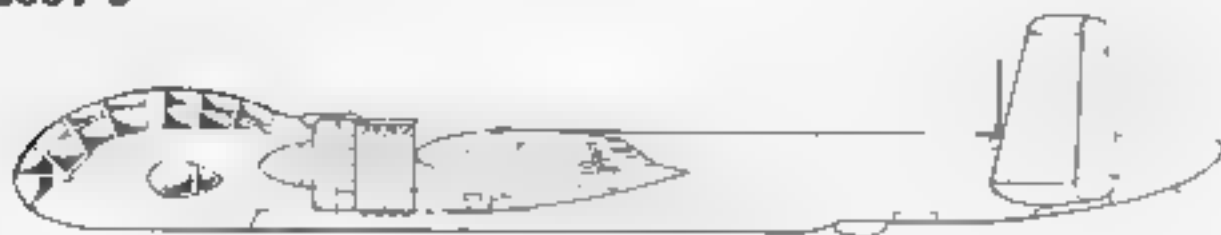
Ju 288V-1



Ju 288V-5



Ju 288V-8



Ju 288V-11



Ju 288V-14



Ju 288V-103



Ju 388

BMW 801 radial engines. The remaining prototypes, however, were able to use the more powerful inline power plants, driving four blade propellers. One prototype, the Ju 288V-5, was briefly tested with a "ducted" propeller spinner.

On all prototypes, the defensive armament consisted of various configurations of remote controlled gun turrets in the dorsal, ventral, tail and chin positions. These turrets carried either 13MM MG 131 or 20MM MG 151 weapons, in either single or dual mounts. Some prototypes had nose mounted fixed forward firing guns, or flexible hand-held weapons in armored gun positions.

By the time the last of the Ju 288C prototypes were flown, estimated loaded weight had risen to 49,500 pounds. The bomb load was 6,614 pounds carried in the enclosed fuselage bomb bay and up to 4,409 pounds of bombs on optional underwing racks. Speed of the Ju 288C was estimated to be 403 mph, with a service ceiling of 34,221 feet.

With the final cancellation of the *Bomber B* program, the surviving five Ju 288B and Ju 288C prototypes were reportedly fitted with 50MM BK 5 cannons and pressed into combat.

The Ju 388 series was an accelerated outgrowth of the *Hubertus Programm* which called for the emergency development of a high speed, high altitude alternative to the failed *Bomber B* project. With the announcement of the *Hubertus* plan during 1943, the originally proposed Ju 188J, K and L variants were respectively redesignated as the Ju 388J (night-fighter), Ju 388K (bomber) and the Ju 388L (reconnaissance) versions.

Although all Ju 388 variants were planned to use either the BMW 801G Junkers Jumo 213E or Jumo 222 engines, supply concerns led to the installation of the 1,800 hp BMW 801TJ turbo-supercharged radial engine on most Ju 388s. Most of the work of converting the Ju 188S and T airframes to Ju 388 standards was subcontracted to the AIG concern at Merseburg (Leipzig).

Ju 388J

The Ju 388J was to be an all-weather day and night-fighter. The pressurized four-seat cockpit was redesigned with flat armored glass windshield panels and a solid nose for mounting the radar elements. Armament was to consist of four cannons (two 20MM MG 151 and two 30MM MK 108s) housed in an under fuselage gondola, two upward firing MG 151 *Schräge Musik* cannons, and a remote controlled FHL 131Z tail turret with dual 13MM MG 131 machine guns (which was to be used on all Ju 388s).

Night-fighting equipment was to consist of FuG 220 SN-2 radar with the early "antler" antennas (the *Morgenstern* radar with its wooden nose cone was to be installed on late production aircraft). Although several variants of the Ju 388J were planned (Ju 388J-1 through J-3), only a few prototypes were actually flown. Production, which had been scheduled for early 1945, had to be cancelled due to the worsening war situation.

Three variants of the Ju 388J *Zerstörer/Nachtjäger* were planned, but all were cancelled by the worsening war situation. The Ju 388V-2 (PE+IB) was powered by BMW 801TJ turbo-supercharged engines driving four blade propellers. It featured a solid nose with an FuG 220 radar and a ventral cannon pod (similar to the Ju 88G series). (Imperial War Museum)

Progressively improved prototypes were introduced for the proposed Ju 288B and Ju 288C series. The Ju 288V-103 (DE+ZZ) did not undertake test flights until late 1943 due to delays in delivery of the power plants. The aircraft's fuselage and cabin were extended and the wingspan was increased. The large bomb bay was common to all prototypes. (Meixner)



Ju 388K

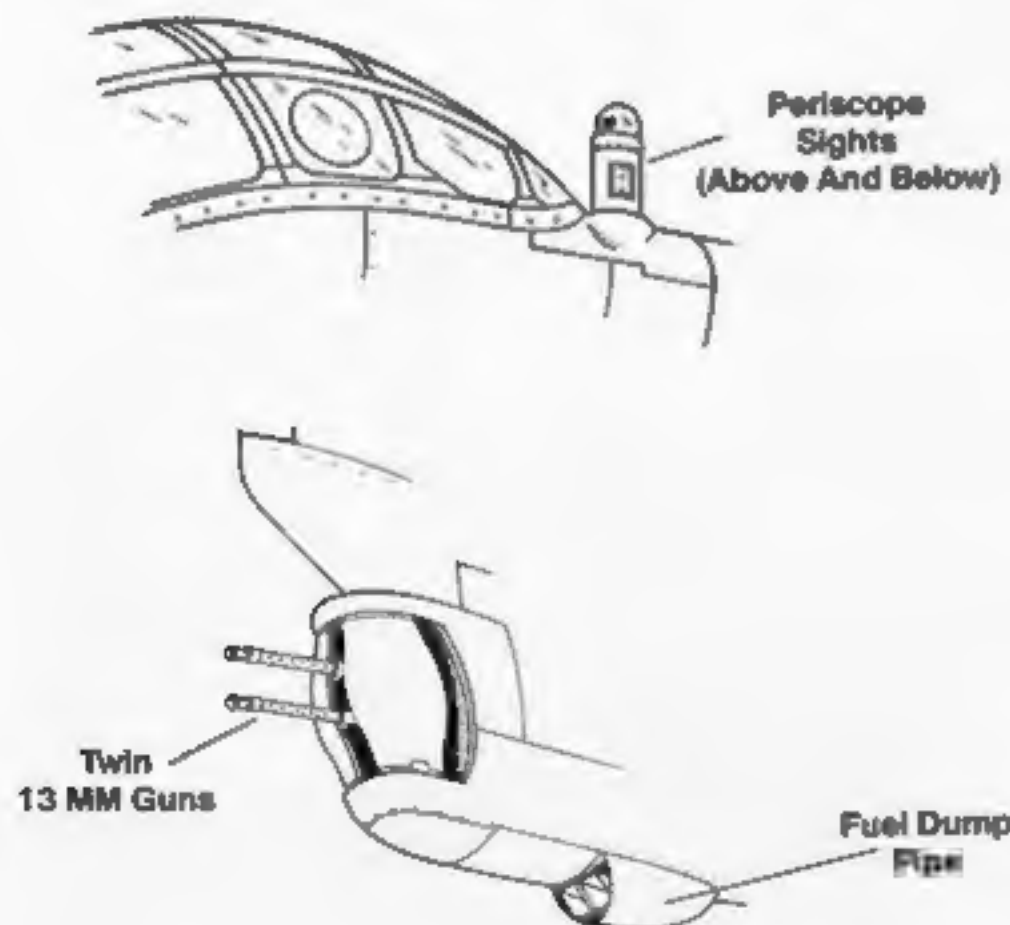
The first prototype for the Ju 388K bomber was the Ju 388V-3 which was outfitted with a ventral gondola capable of carrying a 6,614 pound bomb load. Armament was restricted to a FLH 131Z remote controlled tail turret, with periscope sights carried on both the upper and lower fuselage. Only a few preproduction Ju 388K-0 and K-1 aircraft were manufactured before the program was terminated in early 1945 and other proposed models (Ju 388K-2 and K-3) were not produced.

Ju 388L

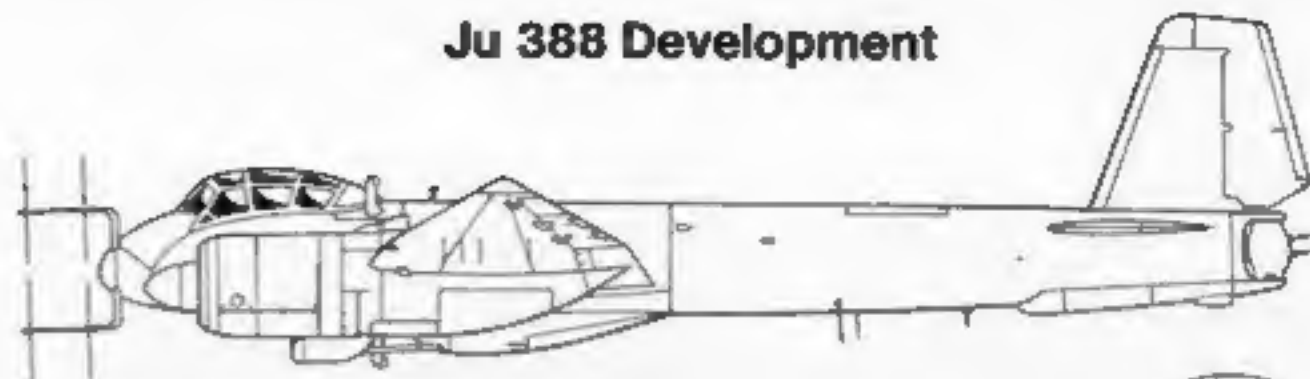
The Ju 388L reconnaissance variant was to be produced concurrently with the Ju 388K bomber. Due to technical problems with the remote controlled tail turret, the first preproduction Ju 388L-0 models were manufactured with a standard Ju 188 tail assembly and a rear firing under fuselage WT 81Z weapons pod with two 7.92MM machine guns. The Ju 388L-1 had the tail turret reinstated, as well as a large ventral gondola for carrying reconnaissance cameras and auxiliary fuel tanks. This made the Ju 388L-1 externally identical to the Ju 388K-1 bomber. Although the Ju 388L-0 was equipped with three-blade propellers, the prototypes for the Ju 388J, Ju 388K-1 and Ju 388L-1 were fitted with four-blade propellers. In its final form, the Ju 388L-1 was capable of a maximum speed of 383-400 mph at a weight of 30,450 pounds.

Of the few Ju 388s completed, a small number were issued to units for operational evaluation before production was terminated.

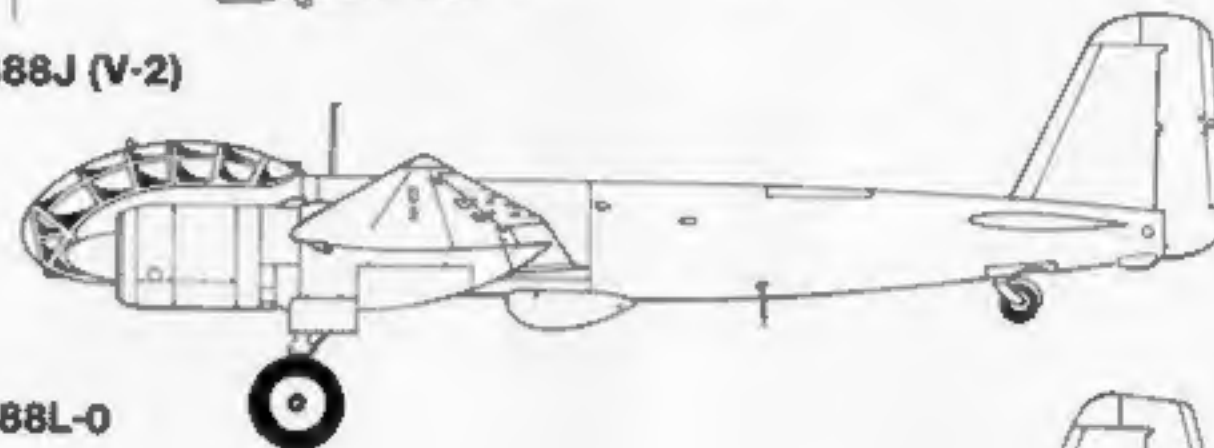
Armament



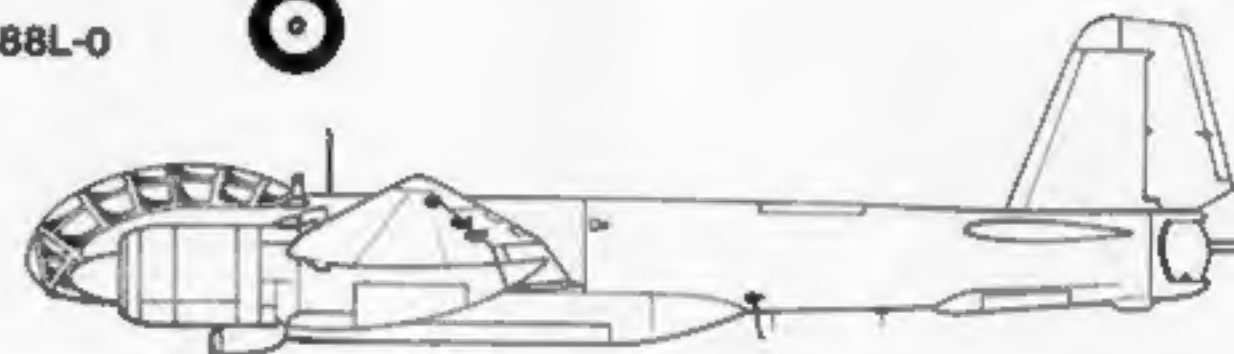
Ju 388 Development



Ju 388J (V-2)



Ju 388L-0



Ju 388 K-1/L-1

The Ju 388K-1 bomber and L-1 reconnaissance variants were externally similar. The under fuselage gondola could contain bombs, fuel tanks or cameras. The FHL 131Z remote controlled tail turret was periscope-sighted, with sights behind the cabin and in front of the bomb bay doors. The Ju 388 L-1 was evaluated in the U.S. after the war, retaining its factory camouflage of Gray-Violet uppersurfaces and Lt Blue undersurfaces. (USAF)





Partially destroyed by a gasoline fire, these Ju 388s were discovered by Allied forces at Leipzig-Mockau during 1945. The dome behind the cockpit on the aircraft in the foreground is the upper periscope sight for the remote controlled tail turret. (USAF)



The crew entered the Ju 388s pressurized cockpit through a reinforced hatch below the fuselage nose. The lower rail turret periscope sight housing is just visible in front of the open bomb bay doors on the ventral gondola. The hangar fire has reduced the tires on this Ju 388 to ashes. (USAF)

Ju 488

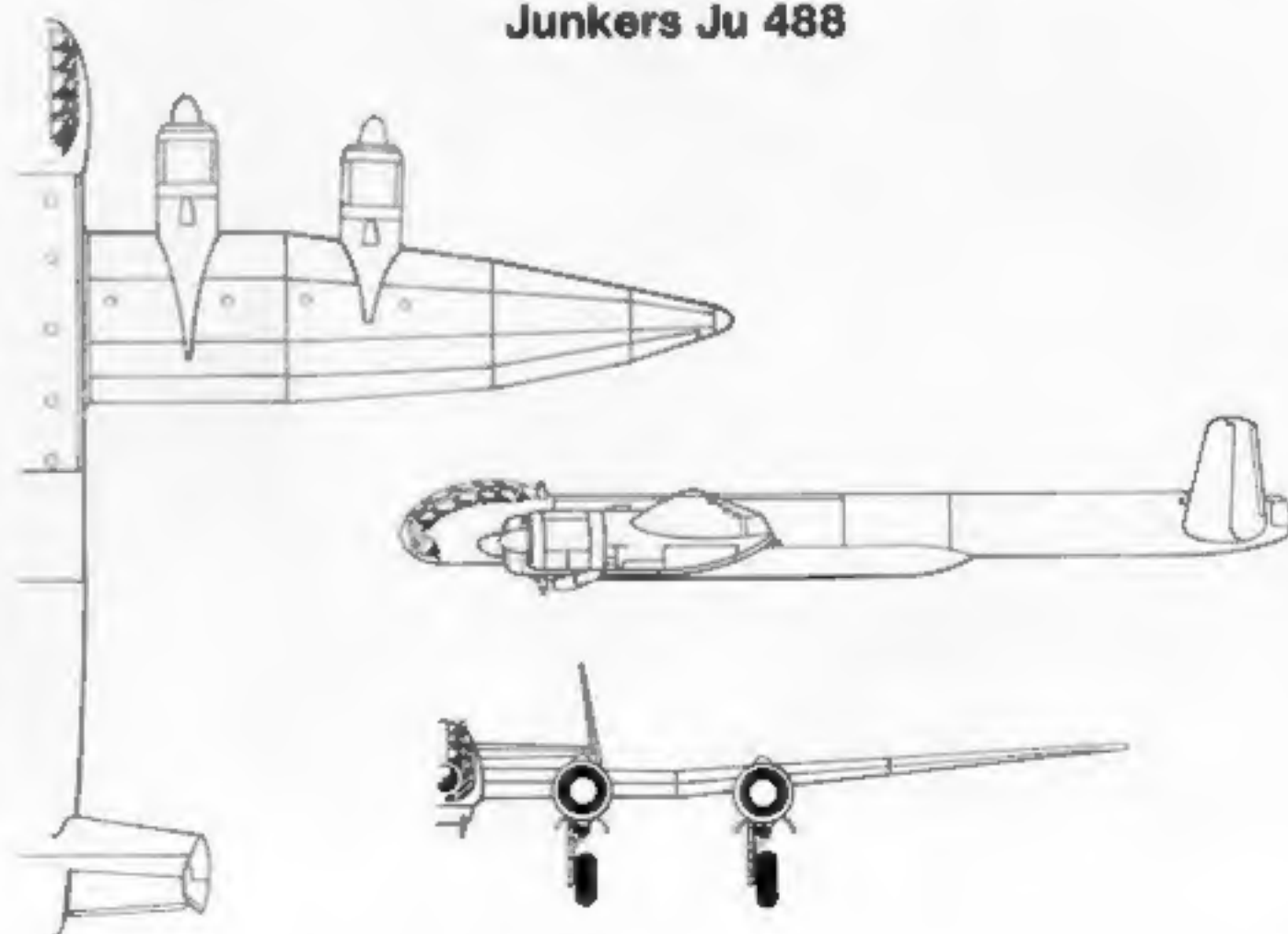
In an effort to produce an advanced four-engined strategic bomber, a proposal was made during 1944 to create a simplified design by combining sub-assemblies of the Ju 188, 288 and 388 and mating them to a new wing center section and main fuselage. This would produce a sleek aircraft with a length of 66 feet 8 1/2 inches and a wingspan of nearly 103 feet. The aircraft was to be powered by four BMW 801TJ radial engines.

Under the designation Ju 488, the first two prototypes (Ju 488 V401 and V402) had the fuselage sections constructed at the Latecoere factory at Toulouse in occupied France, while the remaining components were prepared at the Junkers assembly plants at Dessau and Bernburg. The fuselages were completed by the Summer of 1944, but were heavily damaged by the French resistance just before they were scheduled for shipment to Germany.

Despite this setback, work continued on four additional prototypes (Ju 488 V403 through V406) which were to have featured a deeper fuselage with an increased length of just over 76 feet. None of the prototypes for the Ju 488A series were ever completed before the end of the war.

The Ju 488A had an estimated top speed of 338 to 429 mph, a range of 2,110 miles and could carry 11,023 pound bomb load. Maximum loaded weight would have been approximately 79,366 pounds.

Junkers Ju 488



Luftwaffe Aircraft **from** **squadron/signal publications**

1044



1057



squadron/signal
publications



1085



This Ju 88G-6 (C9+AC) is assigned to the *Gruppenkommandeur* of II/NJG 5 during early 1945. The aircraft was equipped with FuG 220 "SN-2" radar with *Morgenstern*, tail-warning antennas, and an FuG 350 Naxos homing beacon.



A Mistel S2 (trainer) sits on a German airfield under attack by Allied fighter bombers during May of 1945. The Ju 88G-1 had its upper surfaces oversprayed with a Dark Green mottle, while the Fw 190F retained its standard Gray-Green, Gray-Violet and Light Blue camouflage.